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PROCEEDINGS

—OF THE—

NEW JERSEY

State Dental Society

Eighteenth Annual Meeting,

ASBURY PARK,

July 18th, 19th and 20th,

1888.

16531

THE

JERSEY STATE DENTAL SOCIETY.

EIGHTEENTH ANNUAL MEETING,

Asbury Park, July 18, 19 and 20, 1888.

THE PRESIDENT, DR. G. CARLETON BROWN, PRESIDING.

Meeting was opened with prayer by the Rev. Dr. Maddox.

The roll was called by the Secretary.

The minutes of the last Annual Meeting, July 20, 21 and 22, 1887, were read.

Dr. George C. Brown, the Treasurer, stated that the dues of Dr. L. S. Marsh had not been paid up to the time of his withdrawal from the Society, and that therefore his resignation could not be accepted; but his name would have to be dropped from the roll as an expelled member.

The minutes were approved as read.

The following applications for membership were received and referred to the Examining Board: D. L. Seymour, D.D.S., of Asbury Park; sponsors Drs. G. Carleton Brown and C. A. Meeker, S. C. Hamilton, D.D.S., of Bloomfield; sponsors Drs. F. A. Levy and C. A. Meeker, Dr. George B. Herbert, of Spring Lake; sponsors Drs. Wm. Truax and G. Carleton Brown.

Dr. Hull, Chairman of the Executive Committee, read a report of that Committee, which was received.

Dr. Meeker, of the special Committee on Accommodations for Members and Guests at the Annual Meeting, reported that the Committe had obtained accommodations at the West End Hotel on the terms stated in the printed programme. The report was received.

Dr. Watkins, Chairman of the Clinic Committee, reported that Clinics would be held in the afternoon of each day of the Meeting, according to the printed programme. Report received.

Dr. Adams, of the Committee on Exhibits, reported that the Committee had received applications from exhibitors for all the

available space, and the Committee would further report at a later session. Report received.

The Secretary read a communication from Dr. S. G. Wallace, resigning his membership in the Society. On motion of Dr. Levy the communication was referred to the Board of Examiners.

The Secretary read a communication from Dr. G. L. Curtis, Corresponding Secretary of the Fifth District Dental Society, N. Y., enclosing a copy of the amended law of the State of New York governing the practice of Dentistry. The communication and enclosure were, on motion of Dr. Levy, referred to the Legislative Committee.

The Secretary read a communication from Dr. J. Chadsey regarding his suspension of membership. Referred to the Examining Board.

Dr. Walker stated that Dr. Northrop could not be present to read a paper, as announced in the programme, because of the death of a near relative.

The Secretary read, by request of members, a part of the amended dental law of the State of New York referring to assistants in dental offices.

Dr. Watkins, Chairman of the Committeee on Operative Dentistry, stated that the Committee had prepared a report; but unfortunately the Chairman had lost it. Dr. Watkins reported verbally as follows:

"First, I would speak of the Wolrab gold. When Dr. Herbst was with us, two or three years ago, it looked at that time as though there was almost enough enthusiasm in the profession over his method to induce them to adopt it as a whole; but since then we have had time to consider the method with calm brain and critical eye, and it has not been adopted as a whole. There is no doubt that it has done a great deal of good in it. It has its advantages and it disadvantages. The Wolrab, or Herbst method, has done the service of calling a halt to the extreme malleters, which your Committee think is a great point gained. Your Committee have also looked into the matter of the manufacture of gold, and are of opinion that the manufacturers of this country have been, through the competition of the German manufacturers, spurred up to extra efforts, and the result is that they now manufacture a gold equal in every respect to the Wolrab gold.

"The next subject which they wished to speak of is that of the use of copper amalgam. It has come into use all over the country to a very great extent in the filling of cavities in the posterior teeth. It has always been said that what we needed most was an amalgam, or some kind of plastic filling material, which would be a good tooth preserver and possess all the qualities of a good filling material, and at the same time be easily manipulated and introduced into the cavities. Copper amalgam possesses all these qualities, with one exception, and that is color. It is unshrinkable, non-expansive, a poor conductor, a good antiseptic, slightly cohesive and easily manipulated. The only objection to it is its color; and for cases where the filling is not exposed to the eye the color cannot be a very great objection. In other cases, in teeth posterior to the incisors, the cavities can be, in the opinion of your Committee, filled with tin, and this filling covered with gold, thereby saving a great amount of labor to the dentist and much strain upon the patient, and securing an equally good filling. It has been said by some that the tin so used would disintegrate under the gold through galvanic action, and in time become crumbly and of little use. Your Committee has had the same experience, but only in cases where a little tin was used; never where the bulk of the filling was made of tin. In the latter case, the action is just the reverse, the tin is firm and unyielding, and a perfect tooth preservative.

"There has also been a great improvement in matrices for the simplification of the filling of approximate cavities. This improvement will be demonstrated later at the Clinics.

"The pneumatic mallet seems to have taken considerable prominence during the past year, but your Committee is unable to report in regard to that, except to say that those who have used this instrument appear to think a great deal of it.

"The matter of implantation has attracted a great deal of attention during the past two years, since Dr. Younger came from California to illustrate his method. In some cases it seems to be successful, and in other cases not. The first operation of that kind that we saw seems to be a success; but there are others which are decided failures. There will be papers on this subject read by parties who use different methods in performing the operation—Dr. Curtis, of Syracuse, Dr. Kirk, of Philadelphia, and Dr. Smith,

of Ilion, N. Y. Some of them claim that the presence of the peridental membrane upon the root is necessary to success in the operation, while others claim that it is not.

"Last winter we were favored in the Central Dental Association with, I suppose, the first paper on the subject of homœopathic therapeutics in dentistry that has been read before the profession. It was by Dr. Gilson, of Boston, and he gave us several new remedies which we did not have before. Your Committee has tried at least three of those remedies and can speak favorably of them: they are mecurius vivis, for pericementitis, gelseminum for facial neuralgia, and hepar sulphur for suppuration. Dr. Gardiner, of Chicago, gave us at that meeting quite an extended experience in the use of homœopathic remedies in dentistry, and stated that he had had very great success with them in his practice.

"There has also been considerable agitation during the past twelve months in the matter of bridge-work, especially that part of it in which the Low patent, controlled by Sheffield, is used, and we are happy to congratulate ourselves upon the fact that Dr. Parr has come to our rescue and invented a removable bridge which does not infringe this patent. He will show us his invention during this meeting.

"Dr. I. W. Ivory is here with his rubber dam clamps for your inspection. For one of them he claims easy adaptation to the teeth without pain, and that it will hold the rubber dam entirely away from the tooth that is to be filled, so that the operator can have free access to the cavity and not be annoyed by the rubber folding over the cavity. The other one is for the purpose of holding a napkin down around the tooth and holding the tongue away from it.

"I will also show you some new amalgam instruments for the purpose of trimming and completing amalgam fillings; also some fine linen tape for the purpose of carrying powders for cleansing the teeth, or for polishing the surfaces of amalgam fillings. Dr. Bogue was the first one to introduce it here, he having brought it from Paris some five years ago."

Dr. Meeker moved that the report be received as a report. Carried.

A motion of Dr. Levy that the reports of the other two committees be deferred until the evening session prevailed.

Vice-President Hull then took the chair, while the President, Dr. G. Carleton Brown, read his annual address.

"GENTLEMEN: It is your President's privilege, and it has become the custom for him, to open his address with the now historic words, 'Once more we meet beside old ocean's wave-beat shore;' but this year we meet with a feeling of sadness in the remembrance of the untimely death of not only an honored and valued member of our society, but a personal friend of every member with whom he was brought in contract.

"Dr. Scarborough was a man who made many friends, but no enemies. In his quiet, unobtrusive manner he passed through life, antagonizing none, but doing the work allotted to him with conscientiousness and fervor. Three years ago he occupied the executive chair of this society; he has contributed many valuable papers to the literature of the society, and has been a constant attendant at our meetings. You will, without a suggestion from me, appoint a committee to draft proper resolutions, and take such other action as you may see fit.

"As the growth of any new science or profession is more rapid in early life, so a recorder of the events of a year had, correspondingly, more material for a paper of this kind in the earlier stages of dentistry than he has at the present time; but though in the eariler life the growth is faster, in the maturer stages the development is greater; and the changes, although not so marked to the casual observer, are still, to the initiated, great and progressive.

"Could we have coped, a few years ago, with the questions which dental societies now discuss, and discuss intelligently? Could any society have presented such a programme of not only practical and scientific research, set forth in papers and essays; but in the actual working and demonstration of new methods and ideas at the chair, as are presented to you at this session?

"Our programme this year contains eleven papers and twenty clinics, a larger and better programme than has ever been offered to this, or I think I may safely say, to any other *State Society*, thus keeping the 'New Jersey State Dental Society' in the van of state organizations.

"Dentistry has reached too broad a plane to allow of the suppression of ideas for a year. There must be a vent for the pent-up

feelings of the restless mind; and that vent is found in the local societies, where the members come together monthly, and benefit, not only themselves, but mankind at large, by the discussion and development of new thoughts that might be lost by inaction.

"Again, by these yearly assemblages, we bring together practitioners from widely different parts, and added to the benefit derived from the business sessions is the pleasure of meeting friends with whom we otherwise might seldom or never come in contact.

"I take pleasure in greeting you all, visitors and members; any one who has the true welfare of dentistry at heart is welcome. As our session will necessarily be a long one, as the programme is unusually full, I would ask of those in attendance that they be prompt in assembling at the house of meeting and thus assist us in the rapid prosecution of the work in hand.

"It is usual for your President to make such suggestions as he thinks may add to the interest and prosperity of the society. I do not know that there is anything I can offer in this line, but there are one or two matters to which I would like to call your attention.

"At the last meeting of the American Dental Association it was decided to request the dental societies throughout the country to petition the dental colleges to extend their course to three years. I would suggest that some action be taken at this meeting in regard to the matter.

"That proper respect may be shown to deceased members of our society, a rule might, I think, with propriety be formed, instructing the Chairman of the Executive Committee, in the event of such an occurrence, to call on ten or more members to be present and represent the society at the obsequies.

"That there is something wrong in the relations of preceptor and student I am sure is evident to all. If some understanding could be reached by the members of the profession, a regular form of contract might be formulated to be used for all students.

"Another matter which, in my opinion, should receive more attention is professional courtesy to members of our own and of our sister profession.

"It is not pleasant, in reading the daily papers, continually to see the name of some known or unknown person calling himself a dentist printed out in large type, with a lot of impossible offers and guarantees affixed. This is bad enough, though there must be

charlatans in every profession; but when it comes to our own members falling from grace, it seems to me that there must be something wrong. Now, what is it? Can we not find something perhaps in this question of professional courtesy? Is it not about time we reached the blissful stage where professional bickerings, decrying each other's work, making disparaging remarks to patients about professional brethren, and all the littleness of ungenerous rivalry were done away with? It seems to me that at least some of the downfalls of which I have spoken might be traced to this source. Advertising in the papers follows closely on these things; then comes hand-bills, bands, rink performances, etc. Now if any of this is traceable to anything in our conduct to each other, let us rectify it. Let us make the bonds that hold us together more firm. It is to the interest of the profession at large, and to every individual member of the profession. to have it so.

"Several years ago, at a meeting of the section of education of the American Dental Association, a member remarked on the comparatively low social standing of the members of the dental profession. It may have been so at that time, but it should not be so now. Dentistry has been elevated, and with the elevation of the profession has come a corresponding elevation of the members of the profession. A man may now be a dentist and yet be a gentleman; but it is hard work to support the honor of the profession with such barnacles as these kings and conjurors dragging us down. We cannot interfere with the present generation of vipers, but let us do all in our power to prevent the further generation of the traitor.

"I would again ask your careful attention at the sessions and clinics, assuring you that you will be well repaid for your trouble, and that we shall leave this, our eighteenth annual session, with a new stimulus and an awakened ambition to excel, and to be leaders in the onward progress of our noble and loved profession."

Dr. Levy moved that the president's address be referred to a committee of three, to be appointed by the chair, who should report at a later session. Carried.

The chair appointed as a special committee on the president's address, Doctors Levy, Watkins and Hayhurst.

President Brown then resumed the chair.

Dr. W. Irving Thayer, of Brooklyn, N. Y., read a paper entitled *Homœopathic Therapeutics in Dental Pathology.*

HOMŒOPATHIC THERAPEUTICS IN DENTAL PATHOLOGY.

BY W. IRNINT THAYER, D.D.S., M.D., BROOKLYN, N. Y.

Read before the New Jersey State Dental Society, Asbury Park, N. J., July, 18, 1888.

Every person present admits that there is a law of gravitation. Every one will admit that there are certain specifications in regard to the flow of the blood. All know that there are certain laws that cause voluntary and involuntary muscular contraction. It is universally conceded that certain laws must be obeyed to maintain a good physical condition. There are definite laws affecting wind, storms, rains, snows, and our new-found terror, the blizzard. There are laws of nutrition, absorption and appropriation. Laws, laws everywhere, and at every turn. If, then, everything in this sublunary sphere is governed by law, has the Almighty proved this rule by making *one* exception, and never to have established a law of cure?

If there is a law of cure, has it ever been *partly* discovered?

He who has visited cases of small-pox has doubtless come to the conclusion that he would not care to contract so loathsome a disease. I have been told by gentlemen of the dominant school of medicine that if I would inoculate myself with a certain virus of a similar disease I should be less liable to contract a disease similar to small-pox; and in the event that I did contract any disease similar to small-pox, I should have only a variety of small-pox in a much milder form.

The philosophy of such tactics is, that the system already inoculated with a certain miasm, is protected from contracting the same disease of a similar variety in a more intense form. They are right.

The experiments of M. Pasteur, which have been attended with more or less success, are based upon this same protective law. It is a law, and has been so proven millions upon millions of times.

This is the homœopathic law, that like cures or prevents like. *Similia similibus curantur.*

Newton did not make the law of gravitation. He reasoned it out, and discovered that law. Samuel Hahnemann did not construct the law, "that like cures like;" but his penetrating experience reasoned out that "to cure gently, quickly, unfailingly and

permanently, select for every case of disease a medicine capable of calling forth by itself an affection similar to that which it is intended to cure."

But to treat the sick with such a pointer, to direct one's steps, requires hard and laborious study to find out the true *similium;* and where failure comes in, as it rarely does, it is not from want of permanency of the law, but from the inability of him who is attempting to follow that law. He is not up to a full understanding of drug pathogenesis, so as to have found his similium.

Were one called to attend a child whose stomach was full of stramonium seeds, the law of cure would require the removal of the seeds by mechanical means, just as the intelligent dental operator would remove a putrescent pulp. Nature might and might not be able to remove the remaining pathological condition, but with proper assistance she can almost invariably return to her former physiological condition.

In regard to the controversies concerning the value of M. Pasteur's treatment of hydrophobia, we are too apt to forget the very important achievements that he has obtained. "Just consider," Drysdale says, "the silk trade of France has been restored after it had been almost totally destroyed by the ravages of a disease among the silk worms." This disease M. Pasteur stopped by means of the cultivation of the microbe of this complaint.

Shades of Hahnemann!

Thousands of sheep and oxen were likewise saved by him, by inoculation of the cultivated microbe, that caused charbon, or splenic fever. "Nothing could be more homœopathic, and the law upon which these processes depend is the same as that underlying Hahnemann's great discovery."[1]

The original specific miasm, or microbe, has been somewhat modified by cultivation; just enough to change the original poison into a peculiar virus, that, when used to inoculate a subject, produces an analogous disease, which acts as a specific prophylactic. This protects from or mitigates the original specific disease of greater intensity.

Is the millennium about to begin, when men who have held antagonistic views to this well established law of cure begin unconsciously to practice its methods; and when indisputable facts force the unwelcome truth upon their minds? What high priest

other than the little microbe can be performing this marriage ceremony?

Homœopathic therapeutics does not consist in the dilution or size of the dose; but "the leading power of medicine rests upon its faculy of producing symptoms *similar* to the disease and superior to it in strength; so that each individual case of disease is most certainly, fundamentally and rapidly extinguished and cancelled by a drug which is more potent than the disease, and capable of producing in the body symptoms most similar to and completely resembling the totality of those of the disease;" be it by the action of a drachm of the crude drug or by the one-thousandth centesimal trituration.

The nearer one selects a drug whose pathogenesis corresponds to the totality of symptoms found objectively and subjectively in the patient, the higher can he run up his remedy and the quicker will he obtain curative results.

The pathogenesis of a drug is the symptoms that will be noted by a well person who takes the crude drug, or some one of its triturations or dilutions, for a series of hours, days or weeks.

A continuous proving of sugar, chloride of sodium, starch or pepper—all articles of food—will produce certain pathological symptoms. If, then, such simple substances will produce abnormal symptoms, what shall be the result of a continued proving of aconite, arsenic, belladonna, aurum, bryonia, causticum, china, crotion tiglium, eupatorium perfolatum, ferrum, iodium, ipecacuanha, creosote, mercurius corrosivus or bichloride of mercury, nux vomica, phosphorus, platina, sepia, spongia, silicia, sulphur, tellurium, plumbago, thuja and zinc, to say nothing of the many dozens of other remedies?

Make a proving of the bichloride of mercury, of which we have heard so much of late, as an antiseptic, and it will produce the following symptoms: all the symptoms will be worse at night and during damp weather. Corrosive sublimate will produce suppurations, especially in the glandular system: tonsils, for instance. Nothing can equal the first decimal trituration of mercurius corrosivus to arrest, abort and prevent threatened ulceration of the tonsils; and yet some tremble when they use this remedy in the strength of one to one thousand; while for fifty years they who have practiced upon the homœopathic law have painted both tonsils

with this terrible poison in the strength of one to ten, and have not salivated their patients nor poisoned them. I have prevented tonsillitis many times by this means; and why can one do it? Because it will produce this same trouble if proved upon a well person.

Take mercury, and it will make one's teeth sore, loose, and feel too long. Here we have a picture in this last symptom of dental periostitis, and hundreds are the cases of threatened periostitis that I have seen melt away by this treatment as would a piece of ice in a July sun. If the case has gone on to well-established exudation into the parenchyma of the tonsils, or into the periosteum, the case has then got beyond the preventive power of bichloride of mercury.

When a patient has put in an appearance late, and suppuration is inevitable, calcium sulphuratum or hepar sulphur, in the third centesimal trituration, will hasten on to suppuration, and get the abscess to discharge sooner. Then drain, destroy your microbes, and make the canals aseptic. Seal the foramem, and you and your patient will never again be troubled in that locality, unless he is intensely strumous, syphilitic, or burdened with a psoric miasm. Hepar sulphur will control excessive suppuration and bring such exudations down to moderate limits.

Mercury will induce suppurative inflammation. And its employment in inflammatory states of the organs it influences, like the pulp and peri-dental membrane and mouth, when pus threatens to form, is as obvious as it is successful.

Hepar sulphur acts similarly, but goes farther. It will often check impending suppuration; and when suppuration is inevitable it has a wonderful power in promoting it, and conducting it to a speedy termination.

Another effective remedy in dental pathology is a stone! Flint! *Silicia.* This is reduced by trituration, and is used somewhat like mercurius and hepar. Its deep and slow action makes it prove appropriate for chronic rather than for acute disorders.

Hughes says that "The first great property of silicia is its power over suppuration." It does not act like mercury in averting this condition when threatening, and that it is inferior to hepar sulphur for promoting it when inevitable. But, when once established, and, by its excess or long duration, is causing mischief, the

effect of small doses of silicia over such excessive suppuration is sometimes really magical.

The thirtieth will be found most active in old fistular openings from the alveolus; and in cases of traumatic injury, or where extensive inflammation has gone on to suppuration, and the pus has burrowed under the periosteum of either maxilla, so as to cause extensive necrosis, or foul pus exudations from the antrum, silicia from the sixth to the thirtieth centesimal dilution will work wonders. Silicia is for chronic cases of suppuration. No constitutional treatment will remove a foreign body out of the soft tissues, other than by the process of suppuration, or by some mechanical means; so all foreign substances should be removed from about the teeth, and after one has removed the exciting cause, silicia will very materially help the inflamed tissues on to a more speedy recovery.

The dental practitioner has many cases of acute pathological conditions to contend against; notably, acute pulpitis and incipient periostitis, and gingivitis.

Besides the semi-solids and calcareous salts of tooth construction, there is found in its bony canal, not only an artery and vein, but a whole mesh of nerve tissue. When the pulp is destroyed, all these tissues of the circulatory system are destroyed. They, with the nervous mass, constitute the pulp.

For the past fifteen years the writer has not used his lead mallet, or engine, to gouge out any of his patient's eyes. Neither can he remember a single case, where he has applied arsenious acid to destroy a living pulp. It is believed that there is a better way, and that way consists in trying to save the exposed pulp. Such conservative treatment as that is considered by many but one remove from idiocy; and he, who will advocate such proceedings, must be indeed weak minded and behind the age. It is a good thing to be somewhere, and not ashamed of the truth that is within you.

Aconite is another valuable dental ally whose use by the profession has been mainly as a topical dressing. That is well, but there is a much wider field of action for aconite than was ever dreamed of in the philosophy of him who has never tried it.

"The cerebro-spinal system is deeply invaded by the poisonous principles of wolfsbane. The heart and arterial capillary vessels are so paralyzed as to produce violent congestions and inflamma-

tions in any and every organ and tissue in the body that contains capillaries."

What kind of a picture is that for acute congestive pulpitis?

Acute congestive pulpitis is an inflamed condition of connective tissue, vein, artery unto the minutest capillary, and the meshes of nerve fibres, that permeate its whole parenchyma, caused by a stasis of blood distension and abnormal packing. By taking aconite in a sufficiently high dilution, one will produce such a condition in pulp tissue and other soft tissues, throughout various systemic localities, and that is why aconite will cure just such a condition as it is capable of causing. *Similia similibus curantur.*

Aconite's action is like the first stages of inflammation and is one of the greatest blessings that ever got into the hands of him who knows how to wield so potent an ally. But aconite will not control all inflammation, such as the hot stage of intermittent fever, or phlegmonous inflammation of the skin, as shown in erysipelas. The primary impressions of aconite are communicated to the vaso-motor filaments, which regulate the circulation of the blood in all the vessels. If aconite, largely diluted with water, is brought in contact with the web of a frogs's foot, contraction and afterwards dilitation of the capillary vessels will ensue.

Now, in a congested pulp, we first have by irritation of the vase-motor filaments, a contraction of the arterioles and capillaries, retaining the blood within them, and this pressure on the nervous tissue, in conjunction with capillary pressure, produces pain and acute pulpitis. Now, aconite will, if you do not ingest it too low, cause the nerve filaments to induce a dilitation of the capillaries, permitting the static blood to flow freely again, as it will do in the web of a frog's foot; and when this is accomplished, you will have normal function established again in the parenchyma of that specific pulp.

But no one can trifle with that pulp. What caused a stasis of blood in it once, especially if it was from thermal change, will do it again much easier. A relapse is frequently more violent than the original attack of any specific disease; and this holds true with regard to the pulp. Reduce the inflammation by proper constitutional symptomatic treatment, and properly perform the mechanical and surgical operations, which no one but an experienced dentist can do, and there never will be any more trouble with that pulp,

until by the neglect of the patient, there again arises an exciting cause similar to the original injury.

Belladonna, another remedy, reduces the hyperæsthesia of the nervous system upon which the congestion depends. It exercises a calming influence over the deranged functions of reflex action.

Some of the characteristics of belladonna are dryness of the mouth without thirst; tongue, red, hot and dry; profuse ptyalism; grinding of the teeth with moaning, as frequently seen during primary dentition; glowing redness of the face.

Phytolacca decandra, poke-berry: small ulcers on the right side of the cheek like those caused by mercury; flow of saliva into the mouth; saliva is yellowish and has a metallic taste similar to that of mercury; shooting pains in the molar teeth on the upper and lower jaws of the right side. The right side is a belladonna symptom. Disposition to bite the teeth together. The teeth all ache and are very sore, and feel elongated; profuse secretion of saliva; secretions from the mouth, throat and salivary glands, tenacious and ropy; teeth clenched.

Phytolacca is indicated in inflammations of the mouth and gums; spongy gums. In cases of difficult dentition it will work like magic, if the totality of symptoms agree. The following symptoms in its pathogenesis are characteristic: Irresistible desire to bite the teeth together. When you find such symptoms in difficult dentition, you can rely upon phytolacca decandra.

The pathogenesis of sanguinana canadensis is something like that of phytolacca, in that it will produce salivation.

Stiffness of the jaws; pain in the upper teeth; pain in a hollow tooth; pain in one or more of the incisor teeth; and in a carious molar tooth of the upper jaw; the tooth-ache is made worse by cold water, and better by drinking warm water; pain in a carious molar from cold drinking, for two mornings in succession; looseness of the teeth.

Bloodroot is useful in gingieitis, in cases where the gums become very spongy, bleeding, fungoid.

There are other remedies that can be profitably employed homœopathically for the cure of dental diseases, but time and other considerations militate against occupying your time any longer; yet it may be profitable to some one for me to give some idea of how I would apply the principles of homœopathy to assist me to save exposed pulps.

I am quite well aware, that the rule amongst the profession is, when a practitioner finds a pulp that has long been exposed, to proceed to devitalize that pulp. That this may be the best possible method of procedure, for some pulps will hardly admit of a doubt. But under other conditions I should consider it against the best interest of the patient to destroy that pulp.

Two things are as patent as the noon-day sun; the one is that the Almighty created that pulp for specific purposes; the other is that the patient, by his neglect, has done his best to defeat the purposes of his Creator.

The question now arises: What shall the party of the third part do in the premises? According to the feeble intelligence of the writer, if compelled by this high court to answer the question, he would say, save that pulp alive if possible! Other practitioners of greater experience would advise to destroy the pulp every time. If asked why they would so proceed, their answer would be because, sooner or later, say in a year or two, that pulp will surely die! Yes, indeed! "it is appointed unto man once to die, and after that the judgment."

Should a patient come to me with an exposed pulp that had long given him trouble, with severe congestion and a throbbing and beating pain; he desires to save that tooth; and if the cavity is so arranged that I can get a good view of the pulp, horns and all, I save that pulp alive. I have yet to see a tooth with a live and healthy pulp, with an alveolar abscess on its fang, or tendency thereto. I have yet to see a tooth, black, dried and brittle, that has a live and healthy pulp. These are some of reasons for objecting to destroy a living pulp.

It appears to be a very lame and poor argument for me to say, "I always kill exposed pulps, because sooner or later they will die, and nine times out of ten, one will have a putrescent nerve and alveolar abscess to deal with." This may be the sad experience of some gentlemen; but with me it has been different.

It is not claimed that every pulp can be saved, but the large majority can be.

It is no trouble for one to save a freshly exposed pulp that has been exposed by the burr. The reason for this is that there is no acute or chronic inflammation. Dress with carbolic acid, creosote, or the bichloride of mercury to provide against the microbes;

then gently cover the exposed portions with oxyphosphate; gently, without pressure. A freshly exposed pulp will tolerate *gentle* contact, but will always rebel against pressure; but, in cases where there is or where there has been acute or chronic pulpitis, or any inflammation, no pulp that has ever come within the superintendence of your speaker will permit even gentle contact, to say nothing of pressure.

Provisions against contact and pressure are two of the most important matters to be attended to in saving exposed pulps, especially those that have been once inflamed.

It is readily understood that it would be the heigth of folly for one to proceed to cap a nerve while there was any inflammation and without making the parts thoroughly aseptic.

Should I find any inflammation or slumbering irritation, I should, for all acute symptoms, depend on aconite, third centesimal, three drops in a half of a tumbler of water, two teaspoonfuls at a dose once in an hour from two to five or six hours, and then every two to three hours, as I found the case progress. Do not crowd the remedy too fast, or you will produce an aggravation of your symptoms. Always lengthen the time between your doses as the symptoms become less urgent. If one has reason to believe that suppuration is threatening, exhibit mercurius corrosivus in about the third centesimal trituation every three hours for a few times. Mercurius corrosivus is a remedy that has been used for a long time by the homœopathic physicians to prevent suppuration.

I need hardly remind you that our new antiseptic, the bichloride of mercury and mercurius corrosivus, are identically the same drug. The former is used to kill the microbe, and the latter is administered constitutionally to prevent the microbe from forming pus. If one is legitimate, the other, certainly, is reasonable. Thus, again, we find the microbe publishing the nuptial bands, and confirming again that there is one law of cure.

One will not aggravate pulpitis by very light topical applications of a suitable dressing when the pulp is exposed to the air. It is when the original cavity of decay is stopped up tightly that a once inflamed pulp will not permit contact and pressure. It is safe to cap and fill only when there is no pulpitis!

But, sometimes pulpitis supervenes some months after the practitioner has completed his operations, on account of thermal

change or other exciting cause. If let alone, and only a palliative treatment is adopted, such as topical application of aconite to the gums and counter irritation with capsicum or iodum, the case will surely go on to suppuration, and the utility of capping exposed nerves be condemned.

In such cases the pain and discomfort arises from an undue accumulation of blood in all the parenchyma of the pulp; and there is pressure upon its nerve filaments and pain. The capillaries have dilated and allowed the blood to engorge itself within their minute canals, and they are incapable of contracting upon their contents, or the bony dentine walls to accommodate this expansion of the whole pulp tissue; and, unless relieved, we shall have arrest of function, death and pus.

Now, what is to be done? Simply to make the arterioles contract upon their contents and expel the static blood. How can this be done? By giving a remedy that will cause just such a condition as we find in the frog's foot, and here we will find that homœopathic therapeutics can have an advantageous position in dental pathology.

It should be remembered that aconite's most useful position is in the primary symptoms, and not after an exudation of lymph. Mercury is the remedy then; but many times, if too much procrastination has been practiced by the patient, and organized lymph begun to form, nothing but death of the parts and suppuration will be the result.

To resuscitate a drowning man, one must immediately begin artificial respiration, and not wait three or four days to consider the subject. To treat successfully congested pulps, one must begin early.

Those persons who have had exposed nerves capped should be instructed to report early, as soon as the first symptoms show themselves, when, nine times out of ten, a few doses of the third dilution of aconite will completely stop all farther progress of the disease,

A cap must be constructed which is so much concaved that should a little swelling of the pulp in its grief ever occur, it will have room enough to enlarge until you can reduce its size by aconite, belladonna or gelsiminum.

Caps made of beaten silver or gold, no thicker than writing paper, made concave by a punch on a piece of lead or wood by a

broken excavator, have served your speaker very satisfactorily. The cap should rest beyond the horns of the pulp, and on solid ground, where no softened dentine can give way and precipitate a pressure.

I will close by calling your attention to one more remedy—the extract of Hamamelis Virginica, for the venous congestion of the gums, after the extraction of the teeth. This extract is highly curative, and will serve a much better purpose than any other mouth-wash with which we are acquainted.

Thus, gentlemen, we have endeavored to prove to you that there is a law of cure, and that homœopathic therapeutics is a valuable aid in dental pathology.

DISCUSSION.

Dr. Genese—Mr. President and gentlemen, we have, as Dr. Thayer has said, many sceptics in regard to the saving of exposed pulps, and I can only say that I have a record of over two hundred cases of pulp capping within the last ten years, and I was able to say, in a paper read before the New York Odontological Society a short time ago, that some of these teeth, the nerves of which had been capped during the last six years, were to my knowledge still doing good service. The avoidance of pressure in the capping of nerves is of the greatest importance. I do not use any metallic substance in capping nerves; I use a preparation that will, while soft, take the form of the nerve tissue when it is hardening. One of the preparations that Dr. Thayer has mentioned I have had considerable experience with; that is the sulphate of lime. I have very rarely found that to fail in hastening the process of suppuration. I have discarded acon te altogether, for the reason that we get so great an effect from small doses in some patients. In one case I used a very small portion of the diluted tincture of aconite, and the next day I was visited and accused of poisoning the gentleman. I had placed in the cavity a very small portion of aconite on a bit of cotton, yet the effect was so great in a short time that I never could persuade the gentleman that he had not been poisoned.

The cases of sixth year molar exposure of the nerve have been the greatest successes that I have had in capping. The most failures have taken place in cases where the nerve was excised. The principal thing that I have used in combination with capping has been the oxide of zinc mixed with carbonate of lime and

cocaine. I will show you that exposed pulps capped with this preparation will be perfectly oblivious to the action of cold or warmth. I think the exclusion of air and pressure in treating exposed nerves before we attempt to fill will preserve a very large number that would be otherwise lost.

Dr. Meeker—I consider myself densely ignorant in regard to homœopathic therapeutics, but I must say that Dr. Thayer's exposition of the homœopathic law of cure has been the best that I have heard.

I have used nearly all the remedies mentioned by Dr. Thayer.

Dr. Ivory—In every case of exposure of a nerve there is a consequent inflammation from various causes, such as the fluids of the mouth coming in contact with the susceptible and sensitive nerve tissue, and the operation of filling a tooth immediately on finding a nerve uncovered is, I think, altogether unscientific and unprofessional; for the reason that when you put in a filling you hermetically seal the cavity with your gold, cement or amalgam, and there is no way for the inflammatory products to escape. But by the use of medicines, such as aconite or iodine or carbolic acid, and leaving it open to the influence of the air—and the air is one of the principal agents in the healing process; if you have a sore on your hand it is necessary for it to have air in order to heal properly—if you treat it in this way the inflammation may subside and the operation of filling be successful. If you put in a filling immediately you do wrong, but if you leave it so that the air can come in contact with the tissue for a few days, and then put in your filling, you will have better results than if you fill on the moment.

Dr. James Truman—Mr. Chairman, probably I know as little as any other person present in regard to the action of homœopathic medicines. I give homœopathy credit for many good things, one of which is the liberalizing of the old school of medicine, not only in their treatment, but in their use of remedies; but I do not understand the principle of homœopathy, and I have never been able to understand it so that I could bring it into practice satisfactorily to myself. I also do not understand one assertion which I think the essayist made, that aconite increases the rapidity of the circulation, and that he could remove inflammation or pulpitis by its use, through overcoming the static condition of the blood

which necessarily precedes positive inflammation. My idea of the action of aconite is that it is a cardiac depressor; that it acts probably through sympathy with the vaso-motor nerves, and, while it produces irritation of the vessels, will necessarily slow the action of the blood in those vessels. Therefore I do not understand his view of the matter. He may be correct, but it is not so generally understood. I do not comprehend his assertion that he can save nine-tenths of the exposed pulps by that sort of treatment. My own view of the matter is—as he probably will agree, because he said that freshly exposed pulps could be better treated than those in which inflammation had supervened—that it is hardly possible to save an exposed pulp to the extent that has been represented by many in the profession and in this paper, except the condition of the teeth is of a certain favorable character. It seems to me unphilosophical to suppose that a pulp in a highly inflamed condition can be capped and its vitality retained. I do not think it can be done except in certain conditions, conditions of great vitality of the individual, exemplified in very dense teeth, and in those cases softening of the teeth precedes the capping. I have seen recently, under the treatment of Dr. Jack, in Phila., a few such cases; the teeth were extraordinarily dense in structure, showing great vitality in the individual. How many cases of this favorable character come into our hands? Those most frequently met with are of an entirely opposite condition, and we have to meet this condition, and not the others, which are comparatively rare.

In regard to homœopathic treatment, I am really glad that the New Jersey State Society is liberal enough to admit a paper upon this subject. I believe in broadening our views by an honest examination into these questions. Certainly homœopathy, as I understand it, is about as foreign to my conception of therapeutic treatment as anything possibly can be; but I always hold myself open to conviction.

Dr. Luckey—Mr. President, there is no occasion for me to rise to say anything on this subject, about which I do not pretend to know much; but I have noticed a very great diversity of opinion among the gentlemen present in regard to their methods of treatment, and in regard to the treatment of pulps generally. And I want to take this occasion to call to order two or three gentlemen who have been talking about nerves here. I am very sensitive

about that term. We are dentists; and we treat not only the teeth, but dental pulps—not nerves. The public, and most of the dental profession should be made to understand that we have nothing to do with the treatment of nerves except as a part of the dental pulp.

As to the treatment of them, there seems to be great diversity of opinion, especially between Dr. Genese and Dr. Ivory. Dr. Ivory believes that air should be allowed to come in contact with the pulp. We have been taught that the air is full of microbes; and if anything will start up inflammation in a dental pulp, the admission of air carrying these microbes will do it. Dr. Genese covers his pulps with thymol cocaine, and says the teeth will not respond to thermal changes. I believe that is true. But the question is, How does the pulp respond the next day? We know that cocaine will quiet the sensitiveness of soft tissue, but the result is not permanent; and that, unless some non-conducting substance is interposed between the pulp and the outer air, there will be a response. In treatment of inflamed pulps, Dr. Thayer has tried to lead us to believe that it is possible to save nine out of every ten when they are in a highly inflamed condition. Is that your statement?

Dr. Thayer—That is the statement.

Dr. Luckey—I do not believe it is possible to save two out of ten highly inflamed pulps. Congestion of the pulp causes such an engorgement of those minute capillary vessels as to cause constriction of the pulp at the foramen, and unless the foramen is very large death of the pulp is sure to ensue. You may treat and cap it, and you may keep it quiet, but it does not follow that it is alive. There are cases of congestion where the pulp can be saved; but I think it is a very safe rule to destroy it. When a man says arsenious acid, nor anything of similar nature, shall be used in his office for destroying pulps, he is not only doing injustice to himself, but he is doing injustice to his patient. There are many cases coming to the hands of the practitioner where it is far better for both patient and practitioner to destroy the pulps than to try to save them.

Dr. Thayer—With regard to the remark of the gentleman who said that he did not believe it possible to save the large percentage of pulps that was claimed by your speaker, I think your speaker stated distinctly and positively, that it was highly injurious and very

hazardous to attempt to cap a pulp while there was a vestige of pulpitis. Your speaker never caps a pulp while there is the least sign of inflammation. He reduces the inflammation and then caps, and invariably has success. I do not ask you gentlemen to believe me. I know it is a tremedous statement to make, as the subject has been understood by the profession. But I am stating what is true in my practice. I know the experience of the profession is entirely different.

Dr. Stockton—How do you know they are successful?

Dr. Thayer—By seeing my patients frequently afterwards.

Dr. Stockton—Do you cut into the teeth to find whether they are alive or not?

Dr. Thayer—No. If there has been no inflammation or pulpitis it is evident that the pulps are living.

Dr. Genese—The only proof of success is the examination of the cases after a considerable time has elapsed. In all our operations time alone will tell whether they are successful. Dr. Stockton asks the question, has Dr. Thayer or myself examined the capped pulps afterwards to see if they are alive. I can say that I have in very many instances. Like Dr. Thayer, I reduce the inflammation before I attempt to fill the teeth. The cap that I put on can be easily taken off a day or two afterwards and another put in its place. One day a little girl presented herself with a sixth year molar for treatment, and when I attempted to remove the disintegrated tissue the whole mass came away, leaving the pulp exposed so that I could see the pulsation. Here was a typical case to test the method that I had adopted. The child was in great pain and crying. Dr. Knapp was in my office at the time and I invited him to see the child. I showed him that even warm water —cold water was quite out of the question—could not be endured in the mouth at all. I took some of this preparation I have named on a small bit of cotton and applied it immediately over the pulp. The preparation which I use does not give the slightest pain when applied to an exposed pulp; it can be applied to a freshly cut wound without causing pain. In this case when I applied it the pain ceased. The child was allowed to rest a little while, and then water was applied warm, and the temperature of the water gradually reduced until I could apply cold water with a syringe to the pulp without giving the least pain. The effect is

obtained by excluding all moisture and air and pressure from the pulp. When the patient comes again the pulp is capped and is allowed to remain in that way for several days until the capping gradually hardens, taking the form of the pulp, before any pressure of filling material is put upon it. I would say to Dr. Truman that I have found less success in teeth of very dense structure than I have with softened dentine.

Dr. Watkins—In answer to Dr. Stockton's question as to whether any teeth that were capped had been opened to ascertain if the pulps were dead or alive, I would say that I have opened such teeth, and instead of finding a beautiful live pulp with a nice formation of new dentine over it, I have found a nasty lot of pus in the cavity in almost every instance. They have gone on for years, and I have claimed they were grand successes, and I have told this society about the great success I have had in saving exposed pulps, no matter how badly exposed or inflamed they were; but after awhile, when the patient returned for some attention, I would open these teeth, and find a nasty putrescent pulp in almost every case. With me it is almost impossible to save an exposed pulp alive by capping. Dr. Luckey has remarked that he thought two in ten would be a very good percentage of them to save, and I heard a gentlemen whisper that he thought one in ten would be a very good percentage. I think so, too. I do not think I have saved more than one in ten.

I thought Dr. Thayer made a very good point. He said he did not kill nerves; he did something better, he tried to save them. I thought that was very good, but afterwards he went on and said he did save them. Dr. Thayer has the advantage of most of us from the fact that he treats them differently from our method, and differently from the usual method; he treats them homœopathically. It may be that he has this grand success, and that we would have the same success if we treated them as he does. I think the paper is admirably written, and I am glad it was read here.

Dr. Genese—I would state that the tooth I spoke of was opened within a year, and the pulp was found to be in exactly the same condition as when it was capped, and just as sensitive to cold. It has been recapped. I have seen it several times since and it is quite comfortable.

Dr. Ottolengui—I would like to emphasize the remarks of Dr.

Luckey in regard to the use of the terms nerve and pulp. The misuse of terms in that way gives us a great deal of trouble. Dentists do not have to deal with dental nerves except as they are connected with the tissues of the tooth where there is trouble and consequent pain; and probably that would not occur were not the pulp tissue environed by the hard and unyielding substance of the tooth. I understand the pulp to be composed of connective tissue, and amenable to all the laws that govern other connective tissue, and that suppuration in it would be easily controlled except for the fact of its position.

The essayist said that when he capped these pulps he liked to have a little concave surface over it, so that there would be room for any swelling that might ensue; and afterwards he told us that he never capped a pulp until he had it cured thoroughly by treatment. Now if a tooth is thoroughly restored to health when capped, what advantage is there in leaving that space? And if it is not cured, what is the advantage of the space? If it is not cured it would have, from the irritating edges of the cavity, an additional cause of hypertrophy, and the space in the cap would be a place for hypertrophy to get into, and that would not likely to become normal tissue again.

We hear a great deal about these pulps being saved, but we hear very little about their being opened and found to be alive after a length of time; whereas we do open many pulps that have been capped by men of excellent reputation and find them dead and putrescent. I have opened some that were capped by dentists in foreign cities, men of great reputation, and my experience has been the same as Dr. Watkins' that we generally find the very worst condition of things in there; if not pus, at least an odor is noticed as soon as you open it. It is true that some teeth in which the pulps are dead never give any trouble. The pulps have been destroyed in some way, perhaps by a blow or by regulating appliances, and still the dead pulps have remained without giving trouble; but when you drill in and let that "beautiful air" in which is so nice in these cases, I think you will hear from it in a few days. I fancy that the majority of successes that we have in nerve capping are simply gained by covering up the pulp from the air and hermetically sealing it, especially in cases where there is a minute foramen. In cases where the foramen is large I do not think one in a hundred is

saved alive. Therefore I think a little arsenic is handy to have around.

Dr. Truax—Mr. President, with all due respect to Dr. Luckey, I think it is discourteous to say to a gentleman who has been invited here to make an address or read an essay, that we do not believe the statements he makes. I have no reason to doubt Dr. Thayer's assertion, and we have no reason to doubt his reputation for truth and veracity, and while I may not believe just exactly what he does, yet I do not treat the teeth as he does, and when he comes here and makes a positive statement of results based upon entirely different methods of treatment, I think the least we can do is to accord him the courtesy of assuming that he tells the truth. I do not think there would be any objection to that, and, with all due respect to Dr. Luckey, I think that much ought to be accorded.

Dr. Luckey—Perhaps I have been misunderstood. What I said was not intended to cast a reflection upon Dr. Thayer; but that I did not think it was possible to accomplish the result which he stated. Dr. Thayer, I think, will admit that he has not opened nine out of ten of the teeth he has capped for the purpose of ascertaining the condition of the pulps; therefore I think my statement will hold, that he is mistaken in his estimate of the results attained. And I think my belief in the matter will have to stand whether it is considered disrespectful to Dr. Thayer or not.

Dr. Thayer—Certainly, I should be very much pained indeed to open up the sacred graves of all my departed friends to ascertain if they are in fact dead. Such a demand is unwarranted, when one's patients are under constant observation, and by frequent examinations it is found that no soreness, aching, pain or pulpitis has supervened, we may know that the pulps are alive, healthy, normal, enjoying perfect physiological action. We want no resurrection or unnecessary post-mortem discussion.

Dr. Stockton—I have no doubt that if you did open some of the graves you would find them dead.

Dr. Genese—I believe that one-half of the failures in trying to save exposed pulps come from not giving them time enough before capping.

Dr. Thayer—I think the whole matter hinges, not upon making the operation, so much as upon the constitutional treatment

before it is made. I have given in that paper the results of not less than twenty years of observation and practice.

Dr. Wm. H. Truman—The phrase " an exposed pulp " has always seemed to me to be a somewhat meaningless expression. Exposed pulps may be in so many different conditions that our practice and experience in treating them will necessarily vary according as we appreciate the condition. A pulp that has been recently exposed, and that has no pathological disposition, may be, I think, treated and capped with success. I have had many such cases in which I think I have been successful. But a pulp that has been exposed by the gradual approach of caries, and that is in a diseased condition, I do not think can be capped successfully by any method. There have been started certain changes in the tissue that will certainly go on, and which will, sooner or later, cause the death of the pulp. Perhaps they may be kept quiet twelve months, possibly three or four years, but death is inevitable. A careful microscopical examination of a tooth that is seriously affected by caries will show a number of changes which are constantly going on; the effort which nature makes to resist decay sometimes changes the vitality of the organ. My own experience in cases that seemed favorable in every way is that sometimes I have succeeded; but in cases where I am not sure the conditions are favorable, I do not now attempt to cap. I think it is better, when a pulp is partly dead, to apply arsenic and destroy it at once and completely. I think it is much better to do this than to put a cap over the pulp and have it die afterwards. Pulps that die under the cap leave the tooth in a worse condition than it would have been if it had been treated with arsenic in the first place.

I never like to doubt any one else's experiences. It is true that some dentists succeed by precisely the same method that others find failure in. The paper that has been read, and which I have listened to with extreme interest, has been carefully and thoughtfully written, and I do not feel that I can say much about it until I have had an opportunity to read it over. To me it is a new subject, and there are new suggestions there which have impressed me favorably, and I shall look for the publication of the paper with the extreme interest that I have listened to its reading this morning.

The paper was passed.

Adjourned until 8 o'clock this evening.

EVENING SESSION.

Wednesday, July 18, 1888.

President Brown in the chair.

The roll was called by the secretary.

Walter Woolsey, D. D. S., of Elizabeth, was proposed for active membership; sponsors, Drs. Palmer and Meeker. Referred to the Examining Board.

Dr. Hayhurst read a report of the Examining Board, substantially as follows:

In the case of Dr. Chadsey, the Board finds that he has complied with the required conditions, and they recommend his reinstatement. In the case of Dr. S. G. Wallace, they recommend the acceptance of his resignation. The Board report favorably upon the application for membership of Dr. S. C. Hamilton and Dr. Geo. S. Herbert.

Report of the Examining Board received.

No report of the Committee on Dental Medicine was secured.

The election of members was taken up, and Dr. S. C. Hamilton and Dr. Geo. S. Herbert were elected active members.

On motion of *Dr. Stockton*, the name of Dr. James F. Fowler was dropped from the list of active members, and placed upon the list of honorary members, and his dues, if any, remitted.

Dr. J. Hayhurst then read a paper, the last of a series, on the "History of Dentistry," and showed some specimens of dentures made twenty or thirty years ago, also some specimens of spar.

DENTAL HISTORY No. 6.

BY J. HAYHURST.

Gentlemen of the New Jersey State Society:—Once more am I permitted to stand in your midst, and to look into your faces as they are turned to me; and I read in them expressions of interest and expectancy which I have so often seen on many similar occasions. And as memory turns backward the leaves of that holy record, I read that which is to me almost a sacred memorial of all that has taken place since you and I have come together, and become associated, as I believe we have, for the elevation of our

common profession and for the encouragement of all the members of this society. Also for the benefit of the whole human family.

I purpose on the present occasion to treat of the manufacture and preparation of the material of which teeth are made, and of some of the most important manipulations necessary in their adaptation to human wants; and I shall exhibit some specimens of old time work, as well as show some of the material in the process of preparation.

I would most respectfully suggest that perhaps some of the older of our members may regard much of my discourse and perhaps all my specimens as *chestnuts.* If so, brothers, do not deprive my younger associates of the knowledge which perhaps is so familiar to you; but will be interesting and useful to them, when they learn how it was when you and I first hung out our shingle, craving a share of public patronage.

In speaking of the manufacture of teeth it will not be necessary to give more than simply a passing reference to those which were made out of ivory, sea-horse or shin-bone, etc.; which were in use in my earliest recollection, and were worn by different persons with a questionable degree of comfort.

It was when the porcelain tooth became a factor in this matter that their adaptation both as to use, comfort, convenience, appearance and cleanliness of the artificial dentine become a possibility.

The first porcelain teeth that I remember to have seen were single teeth without gums, and had a very close resemblance to split beans, what is known as the "poor man's variety." I think they were made by Samuel Stockton, who had a dental furnishing store on Vine Street, afterward moved to Chestnut Street, Philadelphia. They were intended to be set on a silver or gold plate, and answered a good purpose.

Soon improvements were made, both in the material and the appearance, and prominent amongst those to whom all owe this improvement, if I mistake not, was the firm of Jones & White, which afterward became Jones, White & McCurdy; and still later became the "S. S. White Dental Manufacturing Co." of to-day. It is not my purpose to follow up the train of private enterprise by naming the various firms and co-operations, who make for us at this time, and at inexhorbitant prices, so close a resemblance to the natural organs, that it sometimes makes it extremely difficult

to determine which is the false and which is the real, even by experts in the dental profession.

From the little bean-like article has been evolved, as the profession demanded the gum, the block, and the various crowns, the latter of which are now having a little war of their own as to which shall reign supreme. Well, may we ask: Can porcelain and palatinum go any further?

I wish now to carry you back to about the year 1846. When I entered the office, or rather the laboratory of my old preceptor, John Anderson, who for a consideration promised to teach me the art and mystery of dentistry. Plate-work was at that time the only work in demand. And let me here in passing say that I have never since seen sets of teeth to excel some of those which came from that blacksmith-shop-like-establishment. The teeth, when I first went there, were carved in Philadelphia by Dr. Daniel Neal, and were strictly the product of the knife. They were attached to the plate by long pins reaching nearly from the cutting edges of the tooth through the plate just over the alveolar ridge, and then riveted.

The body of which these teeth were composed would not stand the heat necessary for soldering. But for hardness in resisting mechanical abrasion I do not believe they have ever been surpassed. The composition and preparation of this tooth body will be given hereafter.

The public demand seemed to be for carved block teeth on gold or silver plate, and to furnish these it became necessary that the practicing dentist must extend his powers into the region of art, and learn to be a carver.

I entered the profession at the time that this desire prevailed, and being full of ambition and enthusiasm for my newly-adopted field of labor, I began with more energy than I could now exhibit to gain a much greater acquirement.

So, one fine morning, with a companion, I went into that part of Chester County bordering on the State of Delaware, at that time known as "Dixon's Farm." Here was situated the only quarry of spar that I knew of suitable for the manufacture of teeth. And I think that most of the best material which had been used by manufacturers came from there; but it had now become almost exhausted. And here let me say in passing, that all the substances needed were to be found here: silicious rock and kaolin

in abundance. Huge boulders of white flint rock were overturned, and from the part which had lain imbedded in the ground, and which was as clear as crystal, we broke off and took home all that we needed. My companion had enough to last him his lifetime, and to furnish his customers with as long as he remained in the State of Georgia, which was until the commencement of our late war. And I have now enough prepared and partly prepared material as would have lasted me my natural lifetime, had I continued to carve all the teeth that I have since put into the mouths of my patients.

The next step in order was to prepare the rocks thus gathered. This was done by placing them in convenient piles on slabs in the muffle of a furnace, bringing them to a red heat, and afterwards giving them a cold-water bath. The spar and silica were both treated in this manner. This caused them to break into small pieces, which, when cold, could be taken in the hand, picked to pieces with the fingers, and inspected. All foreign and deleterious matter could then be removed.

It is not my purpose to weary you by giving the various formulæ used by different workmen in the manufacture of porcelain teeth. But I purpose to give the composition, ingredients and proportion of Dr. Daniel Neal's tooth body, because it made such an impression upon me in its preparation that I shall never forget the weary hours I spent over it in reducing it to the proper consistency. It was composed of spar, 6 ounces; quartz, 3 ounces; kaolin, 1 ounce; titanum, to color. These various substances were to be reduced to so fine a powder that no grit could be perceived.

These articles were placed in a large 13 inch wedge-wood mortar, with a long-handled pestle, loaded with lead, and after a day or two was spent in thus going round and round, and when the contents of the mortar began to stick to its sides, enough water was poured into the vessel to make the material about the consistency of cream. This mass again employed all one's leisure time for about a week, when it would be fit for use. All tooth body contained the same ingredients; the only difference is in the relative proportion, and difference in preparation.

Next came the enamel; the various colors necessary were obtained by certain manipulation of the metals—gold, silver, platinum and titanum. The gum enamel was made of gold by a complicated process; and one that often resulted in failure. The pro-

cess by which the best gum color was produced, if I am rightly informed, was invented by Dr. Elias Wilaman, of Philadelphia.

But these things have all passed away, and as the march of improvement opens up to the true devotee the door through which he may walk to greater and higher attainments, so will the past become more and more dim, until it recedes from view. So that to learn the lesson which it teaches, some fitting instrument must be found to bring them to light, and place them in such array as to meet the necessities of the age and times.

The younger portion of our profession can have no idea of the troublesome path along which the older ones have walked, and even this sketch, crude as it is, may lead to a comparison of the olden time when the dental practitioner was often thrown on his own resources, up to this time when every convenience and contrivance can be found at hand in some of the many well furnished dental depots.

And now in view of the many improvements, more work ought to be done in a given time. Better work ought to be done, with increased comfort both to the operator and the patient.

Is it so? Think of it, my young friends.

And now my task is done; I must close. And may I not say that in the long series of years through which these several essays have drawn, I have a feeling that I might be released from again presenting myself in the capacity of a writer of a professional paper again.

What is done is done. If a single person shall have derived any benefit or pleasure therefrom I shall feel amply compensated.

If you, my friend, assembled here have derived one-tenth of the pleasure from hearing as I have in writing the same, then I may say again I am satisfied.

If from the wreck and ruin of that age
  Some noble deed that I may haply find,
To glow a moment on this humble page,
  And bid the world-benumbed and weary mind,
Awhile forget the cares its path that bind,
  Not vainly have I written.

Dr. Stockton—I only wish to say that I doubt very much whether the present mode of making and inserting artificial dentures is any improvement upon the old. No, I do not believe it is nearly

as good as the system described by my friend Dr. Hayhurst, and which he and others practiced thirty or forty years ago. We have not improved upon the gold and silver plates made at that time, which were clean and nice and lasted for many years, with the mouth in as healthy a state, even when the patient lived to be thirty or forty years older, as when the plates were put in. What is the condition of a great many of the mouths to-day that have been fitted with modern artificial dentures when they come under our observation?

Dr. James Truman—It is not a matter for discussion, but the paper interested me exceedingly. It carried me back to my boy hood, to a period antedating somewhat Dr. Hayhurst's professional life. I think that he is perhaps mistaken in stating that Dr. Stockton's teeth were of a bean like character. As I remember them, and as a boy I used to frequent Dr. Stockton's rooms, they were very excellent teeth. On one occasion, in conversation with my colleague, Dr. Wildman, he gave it as his opinion that no modern teeth excelled those made by Dr. Stockton, either as to shape or quality. It seems to me proper, as Stockton was really the first person who made teeth, that we could call teeth, that I should state the fact.

I had a good deal to do in my boyhood days with Daniel Neal's body that has been described here. I remember very well sitting with my father burning teeth in the cellar, and reading Hazlitt rather than attending to the teeth, which went up the chimney.

The question has been asked who invented the mode of moulding teeth referred to. I think the credit of it belongs to Dr. Calvert, now of San Francisco. I remember that he had a particular mode of making them which was introduced at the Pennsylvania College of Surgeons and he was given a gold medal for it. I know of no other manufacturer previous to him.

Dr. Fowler—I think I can endorse what Dr. Truman has said in relation to Dr. Stockton's teeth. Before the firm of McCarthy & Jones was formed, Dr. Stockton made splendid teeth; not gum, but plain teeth. Dr. Locke, of New York, then went into the making of block teeth. They were clumsy and brittle affairs, and their unsatisfactory character drove me into making teeth. I have to differ with the essayist on some points. If you want translucent teeth, you don't want much kaolin or quartz in their composition,

but principally spar. I am surprised to see this piece of feldspar of Dr. Hayhurst's that is fused down. The test of feldspar is to take a piece of crude spar and run it in a muffler and give it a white heat. Then we grind it to a fine powder and put that in the muffler and test it. If the spar keeps its form we do not want any quartz added. I could have produced specimens of teeth made of this compound; eighteen parts of spar, two of silex and one of kaolin. That will make splendid translucent teeth.

Dr. Atkinson—This is a very interesting subject, and the great lesson to be learned from it morally is the wonderful patience that the older men exercised in the prosecution of the art. There is scarcely anybody who understands the chemistry of ceramic work, outside of a few recipes that are held by workmen in ceramic establishments. What is kaolin? It is feldspar minus potash. It is purged in Nature's laboratory and we call it kaolin. What is silex? It is oxide of silicon pure and simple.

History is history; we had better not put anything on record as the final truth about this until more has been promulgated. From 1834, 1835 and 1836, Kingsberry & Andrew were making very fine translucent teeth in the city of New York.

With regard to the shape of the teeth, the bean-shaped tooth referred to was a French tooth. The first that I saw of that kind were covered with blisters on the surface, which answered the purpose of making them semi-transparent, while the large amount of kaolin in the body of the tooth made it opaque. They never looked transparent enough to show the light through them.

My first teeth were made from a bowlder that was transported into Loraine County, Ohio, during the Glacial Epoch, if we are to depend upon the geological record; and I borrowed from a blacksmith a sledge and hammered it to pieces until I got a back-load, which I took home and put some of it into the fire where they were making cast-iron; I placed it in the edge of their furnace and kept it there until it was heated white, then took it out and quenched it and picked out the spar. That is the only way we could distinguish whether we had feldspar or silex. And the coloring matter in that day was what was called rose-red. I do not know that that is known to-day generally. Only a few manufactured it. So far as the molds used are concerned, a man by the name of Foster, a very

brilliant and drunken fellow who went over the country making artificial teeth, showed us that method. That was about 1845.

The moral of the question is this: Would to God we had among the boys of to-day the religious determination to do right that these old fellows had in the early days. If the boys of to-day and the men of to-day would have half as much ambition to know as they have to be considered knowing, we would make big progress. It is this wretched ambition of young converts coming to glory and backsliding in the next six weeks that has raised the devil in dentistry. What is the devil? The commercial spirit What does all that mean? If it was not for the money there is in it, do you suppose they would have liberty to bring about such magnificent displays as we have here to-night? Not a bit of it. This is a commercial age, and there is very little religion carried into business.

Dr. Hayhurst—I do not claim to be the inventor; but I do claim to have been a co-laborer of Dr. Calvert. I was in his office, and we both worked at this thing at the same time. He was the leader, and of course got, as probably of right belonged to him, the credit of the invention. That, I think, ought to go with the remarks of Dr. Truman.

I don't wish to be understood as saying that the teeth made by Dr. Stockton were not good teeth. I say that the first teeth that I saw resembled a split bean in appearance. I do not know whether Dr. Stockton was the maker of them or not. My attention was called to Dr. Stockton's place and business long before I had any idea of being a dentist.

Dr. Fowler—Speaking of Wildman's color, Wildman's receipt was a receipt for block work, by which they took extreme heat to put in his rose-red or continuous gum; and it will make the best gum now.

Dr. Dwinelle—I want to say to some of the younger members that if they would look over the records of the past and commune with some of the older members of the profession they would be surprised to find how many new things there are in those old, very old records.

In regard to Dr. Stockton's teeth, I have now in my possession some of his very earliest productions. If he made bean shaped teeth before these which I refer to I am not aware of it; but I have

some of Stockton's earliest teeth that are beyond anything that we have at the present day in all of the qualities that are desirable in artificial teeth. They resemble Ash's teeth in many respects. The crystals are small and they are dense to a large degree. They resemble the Ash teeth in their creamy appearance, compactness and smoothness; but they had the quality of enduring more heat with greater impunity. The effort seemingly has been among all who have been engaged in imitating the natural teeth to avoid two extremes: first, the extreme of tenderness, delicacy and friability that is connected with teeth made exclusively of feldspar. An old instructor of mine, whom I am ready to say and prove, was one of the most ignorant men that I ever knew in regard to anything else than making artificial teeth, instructed me, to the tune of $1500.00, how to make teeth exclusively of feldspar. If I had known that this subject was coming up here I would have brought some of them to-night for your amusement. Yet it is astonishing how well they lasted. The other extreme is the French bean tooth, which was made almost exclusively of kaolin, which, as we all know, is a species of fire clay. The golden mean lies between these extremes. Kaolin gives opacity, with great strength and capability of enduring heat; feldspar gives delicacy and friability. Stockton combined these qualities to a great degree. I found that he derived some very excellent hints from the Chinese in reference to preparing his body. It is well-known that the Chinese, during their entire lifetime continually work at mixing over the body for their chinaware. It is made of feldspar, which is silex with its natural flux combined with it. Silex is non-fusible unless fluxed with kaolin. The Chinese mix it over and over during whole lifetimes, and in many instances having previously inherited the same material from their fathers. It descends from father to son as an heirloom. Stockton had a very fine quality of feldspar, and he carried that process of mixing and grinding to a very high degree. There was a great deal of grinding and mixing, and it was left in buckets under water. The more feldspar, the more translucency and friability; the more kaolin and silex the tougher the product, with superior qualities for enduring heat. That has been the struggle from time immemorial and will be to the end. We are aware that some teeth made not more than a thousand miles away are deficient in the quality of compactness, their crystals are

coarse. The manufacturers of these teeth could get a good many important lessons from the early teeth workers, makers and carvers.

Dr. Atkinson—I believe Stockton had not the title of doctor, except it was that of Methodist divinity doctor. He was a very earnest man, and had a great deal of faith in what he was doing. He used to go about picking up pebbles on the seashore and examining and grinding them, and when he would be exceedingly happy he would pace up and down the room and say "the hand of the Lord is in it." I verily believe that Samuel W. Stockton could grab a handful of gravel stones and put them in the oven and they would come out perfect teeth."

The paper was passed.

The next subject presented was the application of Logan Crowns by

Dr. B. A. R. Ottolingui—Mr. President and gentlemen: I have not prepared any paper further than what you see on the wall. (Referring to drawing illustrating the subject of tooth crowns.) I think that the subject of tooth crowns is so practical a one that I can tell you all I know about it as easily as though I were to write it beforehand.

When the Logan crown was first made, I commenced to use it, and as far as I can understand, it was simply meant to be an ordinary pivot tooth with the pivot made of metal and baked into the tooth; having the advantage of the pin being fastened in the crown, and the cement with which it was set in the root taking the place of the swelling of the old wooden pin from moisture. When I first got hold of the Logan crowns, I put them in with the idea that the oxyphosphate cement was going to hold them in place. I think the first one I set came out in about two weeks. The next one I think did a little better; but I believe that all the crowns which I set with oxyphosphate cement came out in course of time. Then I tried amalgam; and the last one set with amalgam came out last week. I then began putting them in with gutta-percha; and most of those I set with gutta-percha have kept their places. Still I was not satisfied that I was doing more than haphazard work, and I wanted to do something better. But before coming to what I consider was an improvement upon the old method, I want to show you how the old method was wrong. I refer to those put

in with oxyphosphate. The pin was pointed; and the canal, as represented in this chart, is generally a perfectly cylindrical hole. What is the result? The only point at which this pin touches the walls of the canal, if it touches them at all, is the point where it first enters the root. Consequently, the deeper you cut down the canal, the wider becomes the layer of cement around the pin. What happens? The tooth in the opposite jaw bites against the crown at this point, and there is a tendency to tip it backward. There is a constant strain against the cement, and moisture is permitted to enter, the cement is disintegrated, and off comes the crown.

As to the crowns put in with amalgam, I will say this: Logan originally began with a small round pin, and found that the amalgam eat up the pin. The pin that is used to-day in the Logan crown the amalgam does not eat up; but the tooth is not held as tightly as it can be with either oxyphosphate, cement or gutta-percha. In the case I spoke of, where the tooth came out last week, I do not suppose that its loss can be set down to the fault of anybody. The boy originally broke his tooth in a game of foot ball; then the crown which I put on was knocked off with a base-ball. He wore this last crown two years and a half, and then it was knocked off with a base-ball bat. The point which I wished to get at was to make a tool which would cut that canal the proper shape to receive the pin. This instrument does it. I sent the patterns to the manufacturer, and I take pleasure in saying that I was treated very considerately and handsomely. They took great pains to make the instruments as I wanted them, and after several changes were made they turned out the instruments as they are to-day, and which cut the canal very nicely indeed The reamers are made in three sizes, and they make the hole to fit the pins.

The next point is in regard to the old method of setting those crowns. The crown comes shaped as we see it here (referring to drawing). The object was to be able to fit that to the natural root without tearing the gum. You had to use very small stones or chisels, and in nine cases out of ten you lacerate the gum to a considerable extent; and I think that is one of the causes of recession of the gums. I went to the dental depots to find a facer. Every facer I found was convex on the surface, so that it would cut a concave hole in the root, or they were simply burs; the result being that at the first turn of the instrument it would clog and

would not cut any more. These instruments, which I have devised, are narrowed back from the point towards the shank, so that the cutting point is the widest point. Then these flanges allow the *debris* to run down between, so that the instrument will cut ahead *ad libitum*. When that instrument is put into the root of a tooth it cannot cut anything that is not already a canal. The further you go down the greater the difficulty of cutting, and the less the danger of going through the end or the side wall. From its rigidity it is impossible for it to turn a curve, as with some instruments. The instrument being curved, will take up the *debris*, which it cuts; and when you remove it from the tooth the *debris* in the groove will show exactly the depth to which you have cut; and that can be laid on the pin, and will show exactly how much room you have for the pin. Dip the instrument in a glass of water and it can be perfectly cleaned. The other instrument should also be cleansed after use, otherwise the blood and other material upon them will interfere with the cutting edge.

The way I set a crown is first to ream the canal so as to exactly fit the pin. But I want to warn you against being in a hurry, for one object I have is to depend not merely on the cement, or whatever material is used for setting the crown, but somewhat on the mechanical arrangement of the pin in the root. A cross section shows that the pin is flattened in the center, and has a flange on its two edges. If the reamer be allowed to cut down into the canal, and is simply moved backward and forward, it will drill an elipse, an elipse that will be perfectly rhomboidal; therefore, when the pin is put into the tooth it touches the walls of the canal at four points. There being a square surface and a grooved one, there is a space on both sides for cement. The depression in the tooth leaves room for the cement; consequently in addition to the holding power of the cement, you have that of the impingement of the pin upon the walls of the canal at four points.

I recently had a case where the crown of a central incisor was so badly decayed that I advised its removal and the setting of one of these crowns. The lateral also had a large cavity in it, and the patient wished to have the lateral cut off too; but I deemed it advisable to save it. I cut off the central and fitted my crown and pin, and was about to set it when I found the patient determined to have the other one cut off and crowned also. That I objected

to, and referred the matter to her father. In the interim I filled the lateral with oxyphosphate and put a Logan crown on the central, not using any cement, for the reason that I wished to take it off subsequently, for the easier filling of the lateral. About that time I went to Albany, and the patient was out of the city for three months before I saw her again; then she came in determined to have the lateral cut off and crowned. I refused to do it and the result was that the case was left to me. She was going away again and wanted to know if the oxyphosphate filling could not be left until she come back. I was about to let her go away when it occurred to me that I had not fastened the Logan crown on. I tried to remove it, and found it impossible to do so with my fingers, To be sure about the matter I looked up the record, and found that the crown had not been set. But it was necessary to use the forceps to remove it. I did remove it and set it permanently. That circumstance is related simply to show the value of the mechanical adaptation of the pin to the root, irrespective of the cement. In order to get that perfect adaptation you must cut very slowly with the reamer, because while the reamer may be the exact size of the pin, it is only the exact size of the pin for a certain length, and not as far as the pin goes. If you send the reamer a little bit further, your canal will be too large for the pin. Therefore, I say cut a little and try your pin, then cut a little more and fit your pin again, and so on until you get it in, as you see it in the drawing here. The tooth must not, at first, go quite into place without the use of the mallet, and must be fitted so tightly that forceps will be required to remove it. That, I think, is the ideal way of fastening a crown in position.

A word of caution about the facers. They cut very rapidly provided the canal has been reamed large enough at the mouth to allow the tip to go down and rest on the tooth structure; and there is a great temptation to cut right down to the gum, which I have done to my cost. Be careful too, instead of cutting your tooth square, cut it at a slant, leaving as much of the tooth substance on the lingual or palatal aspect as there is in the mouth. I generally square it off, as you see, considerably above the gum line, then cut this side off and ream a little down into the cavity. I put in my pin, and if it does not touch at this point I ream a little deeper and try again. In nine cases in ten you will find that you will need to take very little off the palatal side.

If you have everything fitted properly, when you tap the tooth into position it will form a good joint. If the edges do not come out as smooth as they should they must be ground off with a smooth stone and disks in the mandril, used alternately. That edge must be squared up to fit against the square edges of the tooth. Perhaps it will not fit as well as you can get it with platinum burnished over the end of it, but well enough. And the crowns stay on.

I may say right here that I have not said much about grinding the crowns. I don't do that. If my tooth is too long for the bite I take it off the root. The pin comes quite near to the surface, and whatever you grind away for the bite weakens the tooth very materially. Every bit of material that you take away lessens the value of the crown if you take it away from around the pin.

In these cases where the roots are not straight, where the canal seems to be curved, if the teeth were to be set in accordance with the angle the point of the tooth would be out of line so that the articulation would interfere with the crown, and it then becomes necessary to bend the pin. It is very easily bent and then driven home in the same way as before. The bending of the pin almost invariably makes it necessary to have the joint above the gum line on the palatal side. Therefore first find out the direction of your root, and the direction of the pin can be changed to suit.

Now when you come to a case where the crown is not cut off, a case where the pulp has been dead for a long time and decay has gone on, there will be too large a hole for the use of the reamer. Suppose that the walls are still solid and the tooth sufficiently strong. It then makes a case for gutta-percha. The decay is removed as far as possible with spoon excavators, and the cavity scraped out, leaving the inside as rough as possible. In this chart you see the flanges which I spoke of on the pin. By cutting those flanges with a knife and bending the spurs down, it gives the pin a barbed appearance. The gutta-percha is placed around the pin and the pin driven into place, and it stays there.

In regard to gutta-percha swelling so as to split the root, I have only to say that you must use judgment in selecting the teeth in which to place it; you must not put gutta-percha in a tooth that is weak enough to be split by its expansion, a result which I think is not much to be feared. Now in cases that are set with amalgam,

the space is first filled with amalgam, leaving the rough lines to hold the amalgam in, and while it is plastic an instrument is pressed into it and turned around in it, and the patient dismissed until the next day. By this method of restoring, with amalgam, the lost substance of the tooth, and reaming out of the amalgam a space for the pin, the root is considerably strengthened.

Here is a tooth that looks very much like a Logan crown, and I take great pleasure in bringing it to your attention to-night. I believe it has not been shown before. It was described to me in Boston by Dr. Blivan, of Worcester. I happened to ask him what crown he used and he described this. A piece of platinum is burnished over the end of the root. A hole is drilled through the center of it and the pin is fitted into the canal. He uses the Logan crown pin. He then takes a plate tooth with cross pins and grinds it, fitting it nicely and setting it at the desired angle, and allowing the two pins in the tooth to wrap around the pin that is set in the canal. He then packs tooth body around the pins and bakes it in the furnace. In this way he practically makes a Logan crown for each case. The only advantage is that he gets a perfect joint with the platinum.

Dr. Van Woert's crown is practically the same thing, with the exception that the final element is gold solder.

Another reason why I call your attention to this crown is that it will not only make a very pretty single crown, but can be made the attachment for bridge work without danger of infringing anybody's rights. After backing you can solder a bridge to it when that is desirable. My experience with the Logan crown tells me that this tooth, if properly and accurately set, will last as long as any other.

I don't wish to argue that any method is a failure because of the failure of single cases; but it is remarkable that so many teeth roots have been lost that have been banded. I presume that is largely due to the way in which the bands are put on—because they are many times improperly fitted; I have been obliged to abandon their use. I have seen Logan crowns fail, as in those that I put on before I made these reamers. It may be in some cases a band is a good thing, but I think that if there is any tendency to gingivitis, or similar diseases, a band is a very bad thing to put under the gum. And it seems to be not absolutely necessary, because the porcelain makes a prettier piece of work, and the

joint is much better, and I have never seen a case where the gum has inflamed around a Logan crown.

It was ordered that the discussion of Dr. Ottolengui's remarks be postponed to the morning session.

Adjourned until Thursday morning at 10 o'clock.

THURSDAY MORNING SESSION, JULY 19, 1888.

The roll was called by the Secretary.

The Examining Board reported favorably upon the application for membership of Dr. W. Woolsey, of Elizabeth. A ballot was taken and Dr. Woolsey was elected unanimously.

F. E. Hendrickson, D. D. S., of Plainfield, was proposed for membership. Referred to the Examining Board.

Dr. Hayhurst read a report of the Committee on the President's address. Report received.

Dr. Hayhurst—Mr. President, if I may be permitted I would like to say a few words in relation to Dr. Scarborough. I knew him. He was among the first in the organization of this Society. A man uncommonly diffident, modest, retiring, but possessed of a fair share of that good common sense that is necessary for success in life. You all knew him as a faithful member of this Society, and I have no doubt there is not a member here but who fully appreciates the manly virtues that he was possessed of. Perhaps there is no one who was more intimately associated with him than I was. There was not a particle of professional jealousy in his character, although in the circumstances in which we were placed our interests were to some degree conflicting and might have engendered a feeling akin to enmity; yet with all this, and with subsequent events that might have embroiled us in professional disputes, there was a love and affection between us which even at this distant point of time I can scarcely speak of and refrain from tears. He was a man who passed through the latter part of his life in great trouble, trouble not emanating from himself, neither was it trouble which originated in anything that he did or could foresee. You all knew him; you all appreciated him; you know that he never put himself forward in any of the business of the Society, but was prompt in every duty imposed upon him, and was calculated to draw friends around him, which he did; but it is sometimes a peculiar condition of things that while such a man lives he cannot have that which belongs to him, but so soon as he drops from our side and is covered

under the clods there seems to spring from those clods a something that calls forth and around him the dearest memories; and it is a fact that no sooner was Dr. Scarborough placed in his tomb than he seemed to call around him the affection and respect and the honor that was due to him in his life-time, and that was given to him in a superlative degree at his death. I thought, Mr. President, that I could bear this tribute short and crude as it is to the memory of our departed friend.

The report of the Committee on the President's address was here taken up, and the first resolution, relating to Dr. Scarborough was adopted. That part of the report relating to Dental College was then read, and its adoption moved.

Dr. Sudduth—I doubt whether we can succeed in getting the advance asked for in the resolutions at the present time, or for three or four years to come; and I would therefore offer the following resolution as a substitute, if the committe will accept it. I believe that in this form it can be carried through in the National Association of Dental Faculties, and it seems to me that it is better to ask for what we can obtain now, than to ask for too much and get nothing.

RESOLUTION.

Whereas, The standard of dental education is constantly advancing, and the demands for higher attainments made upon the members of the profession are becoming greater each year; and

Whereas, The time required to complete the course of instruction in most of our colleges is so short that it is impossible for the average student to meet the requirements and do justice to himself; and

Whereas, It has been proven feasible by actual experiment in several of our dental colleges to lengthen the time requisite for graduation; therefore, in the interests of higher education and uniformity in the degree, be it

Resolved, That it is the sense of this union meeting of the Connecticut Valley and Massachusetts Dental Societies that the National Association of Dental Faculties be, and is hereby requested, to adopt as a requirement for graduation, three full years' study, two at least of which shall be spent attending lectures, in separate years, at some regular school, whose required term shall not be less than seven months.

Dr. Hayhurst—I have no objection to accepting the amendment, but I have no right to accept an amendment unless it is sanctioned by the committee.

On motion of Dr. Levy, that part of the report relating to dental colleges, together with the communication or amendment of Dr. Sudduth, was referred back to the committee. The third recommendation in the report, relating to the appointment of committees to attend the funerals of deceased members, was then taken up and adopted.

The secretary read the annual report of the treasurer showing receipts for the year of $427.23, expenditures amounting to $393.06, and a balance in the treasury of $34.17. The report was received.

The secretary read the credentials of Dr. Faught as a delegate from the Pennsylvania Dental Society to this society.

The secretary read a communication from Dr. R. Finley Hunt, of Washington.

Dr. Hayhurst inquired regarding the practicability of printing the transactions of the society for the years of its existence prior to 1875, or a summary of them.

The secretary said that he had the original minutes of the society from 1870 up to the year of the first publication of the transactions, and that they could be printed provided the society would pass a resolution to that effect.

Dr. Watkins moved that Dr. Hayhurst be made a committee of one to assist the secretary in preparing for publication the minutes of the society, from 1870 to 1874, inclusive. Dr. Meeker offered an amendment, that the original minutes be given to Dr. Hayhurst to prepare them for publication, and return to the secretary. The amendment was accepted and the resolution carried as amended.

A resolution empowering the committee just appointed, Doctors Hayhurst & Meeker, to print the proceedings of the society above referred to, was here adopted.

The President—Gentlemen, a committee was appointed last year, composed of Doctors Levy & Richards, to print the proceedings of that year. We would like to hear what has been done.

Dr. Levy—I declined my appointment on that committee.

The President—The declination was not received, I believe, by the society, and no other appointment was made.

The secretary stated that he had prepared the proceedings of last year for the printer and would like to see some action taken in regard to their publication.

A motion of Dr. Levy that the old Committee on Publication be discharged and a new committee appointed prevailed.

Dr. Stockton moved that the Committee on Publication of the early proceedings of the society, Doctors Hayhurst and Meeker, be instructed to prepare the proceedings of last year for publication, and that they be empowered to make an assessment upon the members of the society to defray the expense of publication. Dr. Levy offered an amendment that the treasurer make the assessment. Amendment accepted, and resolution adopted as amended.

The President—The discussion of Dr. Ottolengui's paper on the Logan crown, read last evening, is now in order.

Dr. Thayer—I would like to ask if Dr. Ottolengui has had any experience in the use of the Brown crown, and what his opinion is as to the comparative strength of that and the Logan crown.

Dr. Ottolengui—I did not say anything last night about the Brown crown, because I like Dr. Brown and I don't like his crown. There seems to me to be no advantage whatever in the straight or single pin tooth over the others, but in the double pin tooth I think there is a decided disadvantage. The double pin being set at two different points in the tooth, with a small portion of the substance of the tooth between the pins, that little portion of tooth substance between the pins is a point of weakness. It is the same with the Logan crown that has two pins. The pin is almost as tight as if it were vulcanized there, and when you tap the crowns into place they split. I have never broken a Logan crown until yesterday here. That was a double pin tooth, and it broke while being driven into position. I do not use the Brown crown for this reason. In the single pin I like a groove on the side of the Logan pin which gives a space for cement.

Dr. Thayer—Unlike Dr. Ottolengui, I think a great deal of Dr. Brown's crown, and, like the Doctor, I think a great deal of Dr. Brown. There is no question in my mind that there is a vast increase of strength in the Brown anterior tooth crowns. Dr. Brown constructs his crown in such a manner as to build up on the pin a small portion of the body which he bakes in the crown, and I think that adds a great deal of strength to the crown. The Logan

crown is gouged out at this point (referring to diagram), and this is the point where the greatest strain comes upon an artificial crown, in my opinion, further down in the tooth; and that is why I consider the Brown crown vastly superior in strength to any other crown in the market, more than a hundred per cent. stronger.

Dr. Littig—I would like to ask Dr. Ottolengui how long he has been setting these crowns.

Dr. Ottolengui—I have been setting them ever since they were made. I think the new pin has been out about two and a half years.

Dr. Littig—Have been setting them in this way all that time?

Dr. Ottolengui—No. I think it is 18 or 19 months since I made the reamers. For that length of time I have been setting them in that way.

Dr. Littig—There have been many pivot crowns put on the market and a large proportion of them seem to have been failures. I don't think we have sufficient data to talk intelligently about them as yet. As to the Brown crown I cannot conceive how we could have a stronger crown simply by the addition of porcelain, because the strength is usually given to a tooth by pressure in the mold in the first place, and when we add to it we do not have the same degree of strength.

Dr. Thayer—The White Dental Manufacturing Company manufacture these teeth in a mold, and they have the pressure there. There is no question that if you get more body of porcelain there you have more strength, and do not weaken the root. If a little is strong a good deal is stronger; there is no question about that. They are both made in a mold.

The subject was passed.

Dr. B. Holly Smith, of Baltimore, then read a paper on

PROFESSIONAL PATENTS.

Of all the questions which we have need to discuss impartially and decide wisely, there are probably none outranking in importance the question, "Should a dentist patent his inventions?" It is not a question, probably, the discussion of which, either one way or

the other, will seriously impede or affect the material prosperity and progress of the profession. In this dawn of the 20th century, the spirit of scientific investigation is so rife and so wide awake, that a question of patents or no patents in any given calling is not apt to stay its inquiries or lessen the number or magnitude of its discoveries.

Neither dearth nor plenty of patents can stifle science; for science and scientific thought were before patents, and will be after they have faded from the earth, if ever that unpractical and un-American period comes.

The foundation of dentistry is laid broad and deep in the supporting substructure of scientific principles. But strange as it may appear in this age of a regal and imperial materialism, there is another standpoint from which we must view our profession and from which we must judge what is to its best interests, what best comports with its true elevation, and that we may say is the ethical standpoint. It is well for us that we can come to the discussion of this question in the peculiarly favorable circumstances of our times and surroundings—with the examples of older professions to guide us, and the free thought of younger minds ready to give potent arguments for new courses—with the experience and judgment of an older order of things, and the ardor and courage of youth and its attendant spirit of audacity, innovation and investigation. A judicious mingling of these elements of conservatism and desire for change should set us aright in our discussion and decision of this great and interesting question. First, then, let us review briefly the example and experience of medicine in this matter; examining at the same time, if we can, the reasons at the base of its course, and the effect of such a course on the progress of medicine.

The position of medicine is flatly opposed to patents among the members of its profession, and medical ethics brands it as an unprofessional action for anyone bearing an M.D. after his name to take out a patent for a medical or surgical invention. To those of us who so strictly insist on recognition as a branch of that noble and time-honored profession, it seems this should be an all sufficient reason for a similar decision on our part. Those who become members of a family or society by birth or by adoption cannot expect to alter its established traditions and laws, while composing

but a small part of its body politic in numbers or influence. They must therefore accept the regimé under which they have been received, until their weight and influence are sufficient to change it; and to all dentists who rejoice in their kinship to the noble science of medicine I would say whether you have taken up medicine or medicine has taken up you; in either case, the ethics of your profession must be the ethics of medicine. Your claim, if there be any among you who have such a claim, to the warrantableness of patents in your profession, is summarily dismissed by a reference to the code by whose principles you must be governed or to whose practice you must prove recreant.

But many of us are not content with so large a use of authority and so small an argument. The desire exists that reasons be submitted to fair and candid judgments, untrammelled, if possible, by prejudice, uninfluenced by that pride of position which accepts professional traditions with unthinking submission. To such we think a strong appeal can be made, which the franker and better natures will not cast away unheeded. The first reasons for which I think it unprofessional for dentists to patent their inventions is based on a view of the position which our profession occupies towards the rest of mankind, as a dispenser of blessings and comforts to all who come under its enlightened and beneficent healing powers. A high conception of the mission of our profession is not only important in the discussion of all questions pertaining to it, but must be the essential element of that discussion, its soul and vitality, else the poverty of degeneration will encumber us with the festering putridness of professional degradation, charlatanism and quackery. With the most settled conviction we hold the belief that our mission is among the noblest of all professions; and if this belief be deception, I do not desire to be undeceived; but will discuss the question from this vantage-ground. Shall we be told that the profession to which we have given the ardor of youth, the maturity of manhood, and to which we hope to add the experience of age, with fervor, constancy, and consistency—that we regard it in no higher light than the earner of our bread; no higher than the donkey to toil before the cart of self-profit, whose hide and bones we would be glad to sell when he can no longer serve us. Shall it be said that we practice dentistry solely for what we can get out of it?

This is what is called a practical age, and I may be talking to practical men, men who gauge their success by the number of figures in their bank balance; but I refuse to credit, wherever announced the statement that the men of our profession would so mistreat and so misconcieve the mission of dentistry as to deal with her solely as the channel through which the dollars are to run from the great public to the individual practitioner, to which main-pipe each professional brother would open his little side pipe and by dint of scooping and scratching from the main and from his brothers' ducats strive to increase his pile. If, then, our mission as professional men does not have money getting for its sole aim; if it is our desire and purpose to alleviate the sufferings and promote the health and happiness of the human race, we should certainly take the humanitarian view and enrich the profession by the result of our labors, extend its sphere of usefulness and honor, learn that the advancement of the profession is more than the profit of the individual, and be content with that honor which dentistry hastens to pay her brainy and unselfish sons. If my brother has been fortunate enough to make a discovery by which the pain of thousands may be lessened, why should he not rejoice to make known his discovery to his thousands of brethren that the dominion of misery and disease may be abridged? Why does he withhold his benefit with suspicious eye and reluctant hand in order to reap a handsome profit from pain ridden humanity? And yet my brother would fain acquit himself of the monstrous charge of trading in human suffering. He would evade the issue by calling on his brother dentists to pay him for the product of his brains, forgetting that the increased cash of his bonus on his patented invention does not fall on that professional brother, but on the ultimate beneficiary.

All that is known to the profession my brother has the advantage of. Does he refuse to contribute his share to that knowledge and practice which enable that profession to accomplish its mission more readily and effectively? Does he cavil amid the sighs and groans of an afflicted humanity about the price he has paid for his professional knowledge? Can he ever form a cash estimate of the value of those services which the unrewarded and unthanked philosophers, the pioneers, the explorers and subjugators of science have given to truth, to investigation and to him?

We have been told that our superiority of vocation is assumed.

That no services can be performed for mankind for which it cannot and does not desire to pay. That all men in this peculiar respect are equal before God, all are kings; but we confess that we see no kingly attribute in this indecent clamor, not for honor, not for glory or renown, but for pelf. Kingliness and munificence, royalty and honor, regal plenty and abundant gifts. We have associated; but to haggle and chaffer for prices and payments: these are not the acts of nature's monarchs.

There are few of us who have not learned at least some of the blessings of charity and of love; few who have not willingly performed services for which the only compensation could be the proud consciousness of the good done. Enlarge such a sphere of usefulness and let the thought that it is not one or a few to whom the beneficence of your labor goes, but to the human race, wherever dentistry is practiced; and if that thought does not possess a supreme comfort and a grandeur for you, your faith in the brotherhood of man is truly weak. Still, to some such a reward may be too intangible. The faculty, which can gather and enjoy the ever accumulating interest of disinterestedness, may be lacking in them. To those I would say it is your duty to use and not to abuse the position which you have not acquired yourself, but which, under God, your profession has given you; and all you do for your fellow man in increasing that profession's general effectiveness and power is consecrated work.

The legitimate, honorable and professional practice of dentistry has brought affluence to some and a livelihood to all who have united ability and application. Yet I do not think there is a man among us who would not forego the just reward of his labor rather than do aught to retard the development of our calling. I will go a step further, and say that the thought that he is adding something to the profession and assisting to project it along its destined course of usefulness and honor would recompense any true dentist for a slighter return for his professional toil and exertions.

Yet does the gift of an invention to the profession make the inventor poor? Only in the negative sense, that it has made mankind more comfortable, added another agency to his profession's powers for work and relief, and augmented his professional brother's equipment. The inventor is no whit poorer; but the world and the profession are richer.

After all, just as humanity is greater than the profession, so is the profession greater than its individual practitioner. It represents the aggregate of the knowledge and skill which forms the equipment of its members. It embodies the science and research whenever and wherever made, which render that knowledge and skill possible. It has seized upon and assimilated, with no royalty, to those patient investigators to whom the truths of nature have been revealed, the results and conclusions of those revelations by mere virtue of its kingly office as healer and curer. The normal function of each member of the profession is to help augment its knowledge and increase its skill. In soberness and truth he should remember that he gets much and gives little. What we want to-day is the scientific spirit—the spirit which, like Chaucer's noble student, will gladly learn and gladly teach. The spirit which inquires, investigates, invents, discovers and scatters the results broadcast to the world; the spirit which has done more for dentistry as a daughter and descendant of science than all the selfish stimulus of patents ever will or ever can do. Can those who patent their inventions in a profession be said to possess this spirit? They lack its essence and vitality. Not only do they not add to the sum total of professional knowledge, but they subtract from it by stunting and dwarfing its more general growth. Just as patent medicines have made it possible for quackery and charlatanism to thrive, so will patent dentistry foster stagnation among dental professional activities. The weaker brethren, instead of either becoming stronger or going to the wall, as they ought, will hang on to reflect discredit upon dentistry by a lame manipulation of labor-saving patents. For the progress of any profession depends more on the thorough study of that science which lies at its base than on a helpless and impotent reliance on toil-saving contrivances, alike enervating to the invention and energy of the poor dependents. If it be said that the free gift of inventions will produce a yet greater degree of enervation and lassitude, I respond no. Patents stifle general exercise of professional inventive genius, not because of the invention, but because of the patent. It becomes the policy of a successful and powerful business to push its patents to the supplanting of other inventions—a few whales swallow all the rest of the finny tribe, and the very device looked upon to foster and encourage inventive talent has the opposite effect.

Have surgical devices been fewer, and have other branches than dental surgery suffered by the exclusion of the patent system from their practice? Free discussion, candid criticism, and unpaid, well-merited praise have served the student in surgery well. The medical and scientific world are looking with impartial eyes upon his efforts. What he does that is good is approved and adopted; while with the approval there is a flavor of brought-up opinions, no smack of a well-disguised advertising scheme; but the frank judgment of a brother student, who has learned something in his chosen work, and is thankful for inspiration and strength. If in the business and trade world the supreme and only stimulus be selfishness and a hankering after the almighty dollar, it were surely next to crime to introduce so niggardly, cut-throat a policy into a profession.

Are we not one society whose courteous aim among ourselves is to help each other, or does each regard the other as his legitimate prey, upon whom to work off his little scheme, or to whom to sell his little patent? I know I need not hesitate for an answer to such questions in this body of men. The *esprit de corps* is as strong in dentistry as *in the other* learned professions, and will stand a yet greater strain than the patent system so long as the *personnel* of her membership feel so instinctively the honorable promptings of gentlemen and of brethren.

We have seen, then, that the experience and practice of the older profession proper is unqualifiedly against patents by its members, and that some of the reasons for this opposition are: From the position—a branch of the great healing art—occupies towards the world, having in its elevated and noble mission a real, and not an assumed, superiority of vocation; from the lack of harmony which the patent system in a profession exhibits with the true spirit of scientific investigation and inquiry; its tendency to stunt and dwarf the standard of eminent professional attainments, and to substitute for those requirements an easy-going charlatanism and a miserable quackery; the subjection of professional methods and instincts to business habits and customs; the submission to trade theories and trade valuations of services and acquirements which are not the subject of trade. We have seen that the stimulus which it offers is at *best* purely sordid, selfish and mercenary; that it cannot be reconciled with a refined and elevated

esprit de corps, but consorts with the cut-throat, devil-take-the-hindmost policy of the mercantile world, with its advertising sufficient to plaster the globe over, its tons of samples, and its hundreds of thousands of iron-jawed drummers.

What are the arguments of those who support the patent system? They are excellently stated by Dr. W. Storer How, of the S. S. White Dental Manufacturing Company, of Philadelphia, in a paper read before the Mississippi Valley Dental Association, in March of the present year. This paper is certainly well-written, nor can we think that better arguments, better put, can be produced for that side. It would seem, however, from our point of view, that the discussion is cast in a low key. The pro-patent advocates are no sooner in the field than they make a bee-line for their legal bulwarks, and set up a vigorous outcry about theprotection afforded their property in all the courts, both of law and of equity. Thus, at the outset, they shift the ground of contest, and evade the point at issue, which is as to its being professional or not for a dentist to patent his inventions.

The position of the pro-patent upholders, in a legal point of view, is impregnable. We shall not attempt to assail it. We certainly know that a patent is property, and that the law protects a man in the enjoyment of his property. Our friends have ably defended a point about which there has never been the slightest dispute, and though they have wasted much ammunition under the impression that they were about to be assailed, they have done themselves the credit of showing considerable legal lore and forensic acumen.

Why should a dentist go into a convention of dentists in a discussion like this and talk about the law of the patent system? Have we either to make or construe the law on that or on other points when the law touches us? Is not this matter troublesome enough as it is, without any legal complexities?

We grant all they demand as to property right and court protection. What then? The question we argue and the principle we contend for is to be settled right here among ourselves. Patent-rights, "the most unassailable rights to property on earth," will not take to themselves wings and fly away if it should happen to be a settled conviction in the minds of the weight of the dental profession that patents are unprofessional. So let us discuss the ques-

tion here from a professional standpoint, in an amiable, dignified manner, and leave to the legal luminaries, truth-twisters and petti-foggers the drawing of nice distinctions between truth and falsehood, theft and profit, etc.

If the pro-patentees had continued their researches through the antiquated and fanciful Blakstone to the modern and philosophic Austen, they would have discovered that the law does not regard the ethical quality of the action it passes on. Its sole inquiry is; Have any published or established dictates been violated? When that proposition has been legally proved punishment follows: when not legally proved, acquittal is the result. Now, as the sole points at issue are the moral and ethical qualities of the discussed course of conduct, we cannot see that the law which would protect our brothers in court can have even the slightest weight here, since it omits the issue itself.

If there is one thing that exceeds the pro-patentees' deep sense of security behind his legal fastnesses, it is his admiration for business methods, business morals and business ethics. These combined form a code of Spartan simplicity, whose first commandment is, "Get all you can;" and the second, "Keep all you get." Most of us have experienced the elevation of business methods; but hear this outbust of enthusiastic wonder by the pro-patent advocate before mentioned, Dr. How:

"There is among men no higher working standard of honor than that of the business man, whose simple statement or working formula is: 'I will sell this to-day for so much;' and when his fellow-merchant, at hand or a thousand miles away, replies, 'I will take it at your price,' that practically completes the transaction."

As to this standard of honor, we have only to say that, in addition to the truly Christian spirit of forbearance which these merchants manifest in not lying to each other, there remains the cold, hard fact that a contract exists between them, which, honor or no honor, the somewhat firm and compulsive grip of the law will enforce, or punish the breach thereof. We see how slippery a customer our business man must be, that his simplest agreements in a business way are thus hedged about and enforced by this cold, unemotional body of law.

The standard is a pretty one; not below that of any honest man, and recommended at once by honesty and policy. We are led

to suppose that there must be some cause for this legal support of the standard, and that some business men at least do not measure up to it with moral exactness. However well the standard may do to buy and to sell by, it can be of no use to us at present; and it pitches the key of discussion yet lower than the legal standard by which it has to be bolstered up. We cannot and will not assume that there is naught in our profession save what may be bought and sold—and if we ever do adopt the motto of Charles I, that "Every man has his price," I trust with splendid folly we shall prefer even empty honors, such as the gratitude of humanity, the esteem and reverence of our professional brethren, as the price paid us for our inventions and brain-products, rather than with business-like instinct to sell for hard cash not only our professional services, but our sense of honor.

Not only are the tests by which our patenting brethren would decide the professional quality of their action unfit criteria, but the motives which they impute to all who oppose the patent system are singularly sordid and impure. They not only simply but openly assert that all the talk about professional honor is naught but the high flown courtesy of a highwayman. A subterfuge which would enable the poor patentee to be robbed of the result of his labors, that the pockets of his brother dentists might be lined. In other words our pro-patent friends deliberately close their eyes in this debate to every view of the subject except the narrowest and most selfish. Having openly avowed their principal defense to be the legal right which they have to their property, having utterly ignored the claim of humanity and the profession, having set up the principle of barter as the basis of their conduct, they go yet one step further and declare that all who dare adopt any other basis, do so because at their heart they are thieves and robbers.

As the patent law is their mainstay, so professional honor is their great bugbear, which, since they cannot comprehend, they invest with qualities too foul to contemplate, bitterly bemoaning the sacrifices which it exacts, and the depredations which it commits. We must say to our friends, however much we may deprecate the injustice of such dishonorable imputations, we must and will still recognize that there does yet exist such a thing as professional honor. The crown and ornament of our vocation. Does the sun cease to shine because an owl more or less cannot see it? We de-

sire to conclude what we have to say on this subject with an appeal against a too great yielding to the encroachments of the materealistic tendencies of our times. Here everywhere its power is felt, but we cannot and will not believe that there are influences and impulses which cannot be treated as things to be coldly analyzed and scientifically dealt with as materials subject to material laws, and material manipulations. And these make life worth iving and make men more than splendid and complex machinery And to these we look with confident expectation and proud hope for the preservation and elevation of professional pride, professional courtesy and professional honor.

DISCUSSION.

Dr. Ivory—I especially like the last part of the paper, showing what wonderful things inventors have done for this universe. Any person who makes an invention must give his time and his money to it, and should be paid for his invention in order to get back what he has spent upon it. A dentist is protected in his work more than is the man who takes his patent in the Patent Office at Washington, and to consider it unprofessional conduct for a dentist to try to get back his outlay on an invention is wrong. Here in America we are protected as no other nation is protected. And it is by this protection that we thrive. S. S. White was a man that we should be proud of. If it were not for him you would not have the beautiful instruments that you have to-day to do your work, and when you buy these of the firm he established you get your full money value. He was at one time a dentist, and in this other branch of his calling he saw a profit for himself and his professional brothers as well, and he went into it and made a success of it.

I have just noticed a statement in one of the papers that J. H. Lippincott, of Pittsburgh and New York, has paid about a million dollars for a patent. Edison has sold one invention for a million of dollars. No doubt if Dr. Smith could patent an invention and get a million of dollars for it, he would accept the money with thanks.

Dr. Atkinson—Whenever this question comes up, there is such a manifest dearth of evidence that either side have grasped fully the foundation principles involved, that it is almost useless to attempt to speak to the benefit of listeners. The great difficulty is that they do not distinguish between law and legislation, between the eternal varieties and the contracts which legislators make to

govern the commercial aspect of our interests. The whole patent system is robbery from the beginning to the end; and every inventor, with the exception of a few, has been robbed by the commercial spirit of the men who get control of the invention. Are we men enough to be fair? is the question.

The very fact that we have to eat something that has just died is a serious question. The bread and butter question is horrible to contemplate. And the bread and butter question being based upon financial advantage, who is entitled to the advantage? When we graduate a man, he is entitled to all the rights, privileges and immunities belonging to the grade which he has attained. Iniquity is at the bottom of the whole of it? What right have we to any rights that are not right at all?

Dr. Hayhurst—Perhaps, looking a little beyond the narrow bounds of the profession, which embraces only a small proportion of mankind, the mention of the greatest evil in the world to-day is contained in the expression of the big fish eating up the little fish. It is not only in the profession, but in the world at large everywhere, this great eternal grasping for something more than you have got. It is exemplified in the great monopolies of our country, in the railroad system, in the telegraph system and in the trusts, combining to appropriate everything that is good. And this patent system has been reduced to the level. As has been observed it is very seldom that the man whose brain was fertile enough to make an invention received the benefit of it; but it goes into the maw of these trusts or monopolies which absorb and take all the benefit, and the poor inventor goes penniless and supperless. It is that evil which we have to strike at in the profession, and it was that which this paper endeavored to depict; and so far as its general course is concerned I think it was an admirable paper. In its general trend it is just what we need. If all the human family had that which belonged to them, that which would be beneficial to them, it would be all right; but when the rights of the human family are taken and sold as merchandise and kept away from the masses and any benefit derived from them has to be paid for, it is an evil. You had that evil in the Goodyear patent. I received a circular not long ago with the very same mark as in that case, and signed by the very same man, threatening to prosecute me for putting on Richmond crowns. This is an evil, and it grows out of the

patent system. I say that it is the bounden duty of every true man within the bounds of society to set his face like a flint against the extension, the support and the maintenance of this patent system.

Dr. Thayer—The profession of dentistry would not be to-day what it is if it had not been for the inventive genuis of some gentleman in the ranks. You know that is true. Eighteen years ago there came into my possession an instrument that has done more good in this profession than any one instrument that has ever been invented, viz.: the dental engine. If you perform an operation in dentistry you are entitled to a fair compensation for it, and if you invent some new method of making an operation which costs you time and money, you should protect yourself by taking out a patent. If it is right for a man to earn an honest penny in one way, it is right for him to earn an honest penny in another way.

I think I can speak on this subject without any prejudice, because I never have invented anything. I have not ability to invent anything that would be of benefit to the dental profession, and I have no interest in supporting this side of the subject; but I do believe in throwing aside all this ethical nonsense and giving the man who has the ability to invent something that is valuable his just dues in connection with it. If it is a benefit to the profession they will buy it and use it for their profit; if it is of no value they can let it alone. There are a thousand ways in which inventive genuis can circumvent it just as Dr. Parr has circumvented the patents in his tooth crown, and as Dr. Brown has done the same in his porcelain crown and bridge work.

Dr. Smith—I will say that I agree with the gentleman who spoke last, that dentistry would not be what it is to-day without the inventive genius which has aided it so wonderfully, and I refer in the paper to the benefits received from such inventions. I want to ask you if in surgery or in medicine, where there can be no opportunity for such regard as it is claimed is necessary to stimulate inventive genius, is there any dearth of inventions or inventors? What did Flint get for his splint? What did the inventor of the laryngoscope get for his invention? They got credit before the medical profession and before the world at large for having done something, and a great deal, to relieve suffering humanity, and that I claim is a reward. When you say throw ethics to the dogs, you

rob us of that which we hold dear to our hearts, and you would rob the dental profession of that which makes it a profession, and reduce its members to the level of trademen.

The subject was here passed.

Dr. J. T. Codman, of Boston, here read a paper.

ENFORCED CLIMATE AND DIET AS AFFECTING THE TEETH.

All problems relating to a solution of the causes of the decayed teeth of the human race are worthy of most thoughtful consideration.

More particularly should they interest us, as the object of our calling is especially for their care, preservation and restoration.

In offering to you this humble tribute of thought, it is my hope that it may awaken an impulse to search with greater scrutiny for causes hardly yet investigated and certainly not yet brought under universal consideration.

If I begin by saying that harmonious physical surroundings and harmonious diet with proper heredity should produce perfect men, women and children, you will probably agree with me; and will say that this result will follow as naturally as cause and effect; that is, given healthy, prenatal and antenatal conditions there would be universal health and no such thing as decay of the human teeth.

From this logical conclusion I think there is no appeal unless we believe ourselves and the creative power to be illogical, and that our reasoning powers are given us to confuse, beguile and perplex us instead of to comfort, strengthen and sustain us.

Following this line of thought let us see where we shall be led by it.

Let me repeat the conclusion, that harmonious conditions will bring forth the well-developed undiseased man; but as we look about on every side what do we see? Instead of a race of idealy perfect beings, only an undeveloped and largely a physically and mentally diseased race, and as we know that man has made but few of his mental and physical surroundings, we conclude that his surroundings have mainly made him; and that they must be to a large extent inharmonious, for had they all been harmonious perfect harmonious beings and healthy races would have been created from their influences.

The general thought that runs through Christendom and has given tone to our ideas and a bias to our minds has been taken from the Jewish and Assyrian theologies, how much farther back in time no one knows. It is of a perfect creation—a tempter, a fall, and a degenerate race because of that temptation and fall.

Were this doctrine as accepted entirely true, there would be no need of farther search for primary causes; but true science, I maintain, starts from the beginning of things in its investigations; therefore, no old document, wherever it may be found, should be accepted as true without close scrutiny. Its theories and probabilities should be discussed; its facts brought out and weighed in the full electric light of modern science before judgment should be rendered on it. The wise men of to-day differ from the wise men of centuries past, in that they have found thousands of new facts to guide them to their conclusions.

It has been considered scientific to say that man is an omniverous animal; but, glancing at the structure of his body, it becomes a question of whether the condition in which you find him as an omniverous eater is a true and normal one.

Certain well-known facts regarding his physical formation, such as the long intestine, the delicate and non-pointed teeth, the weak-muscled jaw and its lateral motion, which belong solely to the graminiverous animals. have led many profound students of physiology to believe that normally man is not an omniverous eater, but one in whom the frugiterous and graminiverous instincts prevail.

If the race of man is not *per se* omniverous, and eats omniverously, such a condition must bring about deplorable results from the violation of one of the primary conditions of health; that is, strict obedience of the physical laws of diet.

Let us now glance at the condition of the earth and its relation to food supply. A new-born child is not responsible for the country into which it is born, whether it is Lapland, Siberia, Brazil or Honduras—whether Italy, France, the United States or elsewhere; but it is evident that if born among the Esquimaux its diet after it leaves the breast cannot be like that of the child born in sunny France or in Brazil. There will be found no whale-blubber in the French Alps or pineapples in Lapland; yet the child born in either country will live and grow to maturity and old age.

Man is the choicest product and the most helpless of God's

creation at birth; but finds protection provided for him in the parental instincts implanted in his progenitors. Launched amid wild and savage beasts, weak, feeble and naked, he finally feeds, clothes and defends himself in spite of his delicate organism by the cunning of his brain and hands, and subdues the forces of nature to his uses. Before he learned to build houses, if there was such a time, he hid himself in caves to protect himself from storms of wind and rain, or he wove the branches of trees together for a habitation, or he climbed into a high tree top, where no wild beast could follow, for security and a home.

As we go back in the ages, assisted only by the light of the imperfect science of to-day, we find phases of man's existence that are clouded in doubt and darkness; and generations will probably have to study problems of geology, cosmogony and anthropology before the question of what is our normal race condition will be positively settled; but, personally, I am satisfied that the earth's condition at a time not beyond tradition was very different from the present in its relation to food supply. That the earth at one time was covered with verdure from pole to pole; that the elephant and the mammoth dwelled once in the umbrageous shades of the polar region and meandered amid its giant trees, hardly admits of a doubt. From the nature of its vegetation, the remains of which are still found, the climatic temperature must have been mild, and a more equable climate extended over the whole earth than at present exists.

Since that period, at some unrecorded time, an era of intense cold has passed over the earth. Whole continents have been buried in unmeasured depths of snow and ice. Geologists call it the "ice age." From the north pole to the equator, adown the valleys of Labrador and adown the valleys of Brazil alike, have moved the ice glaciers. The fearful cold winds have utterly destroyed all the vegetable and vegetating food for man, except, possibly, in some of the now called torrid regions. Doubtless the race was depleted; doubtless cold, hunger, poverty and death reigned everywhere, and the wild beasts, made doubly savage by famine, preyed on the living and the dead.

By what tremendous catastrophe or cataclysm this event came about we do not know. How many ages poor humanity wandered over the earth in a half-starved condition no one knows.

Ignatius Donnelly, in his interesting book, entitled "Ragnarok," theorizes that some cometic body or disrupted planet, coursing through the immense spaces of the heavens, came so near as to rain showers of boulders, stones and sand on us in immense quantities, and heated the waters of our oceans and rivers so hot by its contact that immense quantities of vapor were carried into the upper heights of the sky, and falling again, as fall it must, in snow and cold rains, the temperature of our little earth, only 25,000 miles in circumference, was so thoroughly cooled that it has not yet returned to its normal heat by the slow warming process of the sun's rays.

It is the fashion of our day to cry down Donnelly on account of his attempt to prove that Bacon was the author of Shakespeare's plays, but we must not forget that it takes an ingenious and a searching mind to make a plausible plea to that effect; and no man can read "Ragnarok" without admiration of the thought and research spent by the author of that remarkable work, and I commend it to you as highly interesting, and a book to awaken thought and investigation into world problems.

The immense littleness of our globe, in comparison to the greatness of some of the planets and fixed stars, should teach us all to be humble. Vagrant wandering comets have been chronicled whose sizes have been so large that our earth would make but a scarcely perceptible pinhole in passing through the immense train that swept by, measuring a hundred million miles in length.

Taking, then, our human anatomy; taking man as a fruit-eater; as a nut and a grain-eater; as a lover of the beautiful things that smell sweet and are luscious—a lover of strawberries and grapes; of those fruits that delight the eye—the peach, the pomegranate and the orange; that are sweet to the taste, as the date, the fig and the banana, as well us many tropical fruits unknown to us here. Take him as a lover of beautiful flowers that nourish the blood as well as the mental organism. Take him even as a lover of eggs and the birds that lay them, as a partial flesh-eater, if you please, and decide, as you have a right to, that this combination of bread and meats and fruits with a genial climate will give healthy blood, bones and muscles.

Put this organism, this spiritual being—by that I mean a being with high instincts and tastes, soaring upward, restless, desiring

cultivation, and not satisfied with a merely animal life—on an ice plateau, with ten months of winter and four to fourteen feet of snow and ice, with a diet of raw fish and clams and nothing else, and what would become of him? What sort of a grand man would he make? Why like the present Esquimaux, a man without influence, power or nationality.

Let us look at the reverse. As we approach the bread-eaters, notably the Teutonic and Slavonic races, how rapidly power increases, how rapidly intelligence increases, how ingenuity thrives, how muscular the men grow, how active their brains grow, how the nation and the arts of civilization thrive.

Starting, then, at a point of time more or less remote, with a salubrious climate and a bountiful, fruitful vegetation, what would be the gravitation of the race towards the destruction of beasts and the feasting on their carcasses, or towards the cultivation of the beautiful fruitage that begins in leaves and flowers and ends in tempting clusters of grape and grain? Towards the latter, I think.

And the reason why I think so is from my observation of the present tendencies of our people. Picture to yourself the average diet of New England people two or three generations ago. It was of bread made of Indian corn, rye and occasionally barley and wheat, dry beans and peas, cabbages, squashes, pumpkins, parsnips, turnips, carrots and onions, apples and hard pears. For meats, beef, pork, poultry, mutton, wild game and fish. These were the principal foods of a family for nine months of a year. For sweetening they had molasses and a very little sugar; and for drink, apple cider, rye coffee, rum and water, milk, some genuine coffee and very little tea.

When "killing time" came, the family hog was slaughtered. A large portion of it was put in salt brine; some parts of it were smoked and some made into sausages. It was the same with the cow or ox that was killed. A part was sold to friends and neighbors and the remainder corned, and a good stock of salt codfish was laid in for winter's use.

All this is well known, but such great changes have taken place since then that it is worth while to dwell a moment on them. Wheat, finely ground, has largely taken the place of Indian corn. Oat meal is largely used where once it was not. Rice, sago,

tapioca, and various preparations, as farina and grannum, are consumed. Potatoes are enormously used, where seventy-five years ago they were hardly known. Tomatoes, now in general use, were then unknown. Numberless varieties of all the vegetables of those days have been added to our list, such as the horticultural seavey and Lima beans, toothsome peas, new varieties of sweet corn, turnips, onions, squashes, cauliflowers, celery, etc., etc. Varieties of apples have reached the hundreds, and pears also. The tiny strawberry has grown to be a mouthful each. The Lawton blackberry, found in Dorchester, a part of Boston, is a wonder in size and flavor, and is not beyond the ability of the average family in cost. The cultivation and production of fruit and vegetables in our orchards and gardens is enormous, and as our seasons are not long enough to supply the demand, we start our crops largely under glass; and we make our fruit season longer to the consumer by "cold houses," where we keep it into the winter. Ready transportation brings us strawberries from Florida and from Nova Scotia in the same spring and summer months.

From the South early spring brings us all kinds of young vegetables, and summer follows with early fruits, and then melons and peaches, and still the demand increases year by year. From foreign lands come grapes, figs, oranges, bananas, dates, prunes, olives, lemons, and nuts, increasing in quality and quantity every season.

These give our people a different and, I believe, a better diet than formerly. Add also to this the immense quantity of canned fruit and vegetables that are used, and we can see readily that the dietetic change that has taken place, and is taking place in our people, is very great and remarkable.

The diet of former years had its result. Transportation was difficult and slow, and as the winter progressed, dinners as well as as other meals were monotonous, being largely of corn-bread, salt pork, salt beef, salt fish, and winter vegetables. Cabbage, beets, carrots, and parsnips were boiled with the meats. Pork was fried and hashed with salt fish; but down they all went. Hard work made it possible to digest them, greasy as they were; and they washed them down with a daily ration of diluted rum and molasses, and plenty of cider. Such is a rough, but I believe a true sketch, of a former New England diet.

One of the great departures from earlier diet lies in the less use of fat. Economy was a habit and a teaching of the people, and nothing was to be wasted, and so in order to eat the whole animal they made suet puddings, and often flavored them with wild tanzy weed. They gloried in fried pork, and fried beef, and fried doughnuts. Every thing was rich with gravy. Meat was minced with condiments, with a good proportion of suet, and made into pies and the very word *rich* indicated to the minds of the people something greasy and fat, and they *thoroughly agreed* with:

> "King Arthur who a pudding did make,
> And stuffed it well with plums;
> And into it put great lumps of fat
> As big as my two thumbs."

Contrast the ideal of those days with the charming cookery of our best hotels and houses of to-day. There everything is free from that kind of grossness. What our people have taken from one side they have placed on the other. They have banished the fat and put the fine growths of the summer and autumn in its place, and this is, I believe, a natural tendency towards the desirable and normal diet; and with this banishment has vanished the severity of a large class of diseases, and notably with gross feeders, the gout.

But we may ask how is it that man has the almost universal flesh eating tendency if he is not normally a flesh eater? We find him a promiscuous feeder and yet my idea is that he is not naturally omniverous; but if not, where did he get his omniverous desires.

The reply is that his surroundings have made him what he is, or rather his past surroundings have given him the tendencies and habits that still cling to him and yet remain, it may be, for centuries longer.

Believing as I do that the conditions under which the human race found itself during the age of ice, the succulent vegetation was blighted and humanity was fast drifting back towards savagism from which it may have originally sprung, there must have been a time when little other food but animal could have possibly been obtained and the human race *had* to eat what it could get to eat.

The severely cold age must have existed many centuries and man must have gone as far from the normal condition of diet as the climate varied from its normal condition of food production.

Had humanity, had human beings been beings of the lower order like cattle or sheep they would have perished "like cattle,"

as we say, from the fact that the lower races have not the protection placed around them that man has, and are not able to withstand marked changes of diet. But man with his wonderfully adaptive digestive apparatus by becoming omniverous, or, in other words, by feeding upon any and everything he could find to eat, fish, flesh or fowl, anything flying in the air; anything living in or on the earth; anything in the waters or on the shores along side of them, kept alive the human race to fulfil the destiny appointed for it. And it survived, when many of the lower races perished forever.

Mankind is slow to move out of the ruts it gets into, be they what they may, of kingcraft, of priestcraft, of witchcraft even. It rocks its babies in the same kind of cradles it did hundreds of years ago; its household utensils are the same; its traditions are the same, and likewise its diet is the same. Only among the pushing bread eaters, the restless and ambitious white races forfeited by a destructive religion has progress been made, but that progress comes slowly. Man, as has often been said, is a creature of habit, and there is a constant contest between the forces within with their normal tendencies and the habits forced on him by his outward surroundings.

We all know what is the normal diet of an infant as it lies on its mother's breast, in the first few months of its life; but what will circumstances force on it as soon, or even sooner than it leaves its mother's milk? It may be its mother gives it a meat-bone to suck; or may be it fills its mouth with blubber oil; or it may be she gives it oatmeal or rice, or potato and garlic; and for its drink she gives it, may be, cows' milk flavored with coffee, or gives it a sip of beer "to make it a German," or a little tea because "its mother likes it," or the sugar from the bottom of the wine-glass, because the "father likes it."

And as the child grows older, its mother prepares its food for it; and she greases its potato, and she salts its potato, and she peppers its potato. She mustards his meat, and fries him a doughnut, and gives him some mince pie. She sets his morning cup of coffee before him only a trifle weaker in strength of decoction than his father's, and gives him hot batter cakes and fine flour bread, soda raised; and does all she can to make a man of him.

And where will he land? As a man of diet on his father's and mother's platform. Only he will have poorer health, poorer

teeth and a poorer stomach; and at the end of a few years will have assisted the good doctor towards paying for his carriage, or the good dentist for filling his honeycombed teeth, or the good sexton for his children's funerals. Tell me, if you can where, in all this do the inherent instincts of his nature have a fair chance to show themselves? And tell me also if there is not here some chance for a science of diet to interfere!

We need science at the base of diet, and its proofs must rest in physiology, and not on the habits of men that may be forced on them by their various surroundings. In anticipation of this science, I suggest this axiom as one to study—one to prove or disprove:

The normal diet of man will keep his teeth clean without assistance from powder, soap or brushes.

If this is so, we have something to guide us towards the great end we strive for: a knowledge of a basic fact. The animal, led by its instincts and given little power to vary from a strict course of diet, must obey, and is found everywhere in its native haunts with excellent teeth, and largely so in its domesticated state. Its breath is sweet, and it pays no doctor's bills. Why should not man's teeth be good, living on a proper diet?

I will formulate another axiom: *All food eaten should be soluble in the saliva.*

That is, it should be so soluble that, after eating, the tongue and the movable muscles of the mouth, with the saliva, shall be able to wash and brush the teeth free from all sticky particles of food by their automatic motions.

This seems, on the face of it, to be true; because it is so with all the lower animals without exception. Even your horse, your dog, or your cow, stalled as they may be, hardly present an exception to it.

I do not now propose to follow out the results of the application of these maxims to daily life; but they will debar from use considerable of the food now consumed, and, as I believe, the portion that is unnecessary and unwholesome.

As surely as you know the dietetic habits of an individual or a race, so surely should you be able to diagnose their condition of progress. Take our savage tribes and analyze them. Raw or half-cooked meat, pounded maize, a wigwam, a few pine-knots for light,

and a pipe of tobacco may be enough for them; but it is not enough for me.

We must be satisfied with our condition or not satisfied. If satisfied, it is doubtful if progress will be made. We are not generally contented. The element of dissatisfaction is placed in our minds. That is our warrant of progress. And if we reform our diet, we must move out of our old habits. One by one will they be swept away, and we must move out of the lower habits into the higher.

Can a man be made savage and cruel by his diet? Can he be made stupid by his smoke? Can he be made nervously susceptible by drink? And by this combination of habits be ready to commit all petty meannesses on other individuals? If diet and drink have their effect on individuals, why not on a nation, which is but a congregation of individuals? And if it can be made savage, brutal, cruel, and unjust by its diet, why may it not be made courteous, kind, and just by another diet? If it, or we, can be made unhappy by a diet, why may we not be made happy by a change of diet? If our diet does not develop us, why may not another diet develop all our fine physical, and spiritual instincts? And in correlation to this, why if our diet and habits produce decay of our teeth, may not another diet better develop and conserve the teeth?

You may say that this view is not very encouraging, that it will be centuries before the time that men will learn to live aright, and avoid the sweltering habits we all know to be wrong, much less avoid those about which there are chances for varied arguments, and to wait until we again have an equable climate, before we can get into normal conditions, is a hopeless wait, and that the most we can do is to expect that in some remote era of the future, such a thing might be possible. Nevertheless, I say, there is no reason why we should not turn our faces and our arguments towards the right way.

For thousands of years we have been travelling towards the right government; murderous kings and nobles, and torturing priests have stood in the way. We look down the vista of centuries and our eyes can see no end to the cruelties that the privileged classes in the past have perpetrated; but were we at the other end of the vista, we should see it widen and broaden into this great and glorious republic, the culmination of the theories and work of the past students and patriots of unnumbered centuries.

For hundreds of years we have, as the representatives of the Christian idea, been prophesying the reign of an era of peace and good-will on this earth. Has it yet been accomplished? Is it now time to give up this idea as futile? *No!* I think I hear you all at once exclaim: We do not yet despair of that result.

And shall we despair that only in the dim future can reasonable men expect to find the era of perfect forms, harmonious characters and beautiful teeth? No! Our duty is to press onward towards the highest mark of our high calling, working both as present benefactors and as aids towards some more glorious era on this earth that we cannot yet see, but can dream of, hope for and desire for our children and our children's children. In doing this, let us turn towards the true diet, study well its conditions and its promises; study well the laws that produce health of the body and the mind. The glaciers or rivers of ice once swept down the torrid Amazon valley—once went sweeping over the whole eastern slope of this continent. Once, also, the deep waves of the ocean rolled in thunder tones over the spot where we now stand.

In some way or other change will take place as change has taken place. How and when I know not. Out of the fiery volcano and the deep sea has come arable land. No longer is this continent buried like the polar regions in everlasting ice, but verdure and blossoms abound. If the promise of the past has not been broken to the ear or to the heart, why may not the promise of the future be fulfilled also; and the denizens of this earth, slowly but surely, placing hand in hand and joining the great brotherhood of science, push their way up into the regions of peace, purity, justice, health and happiness?

President Brown—I want to thank Dr. Codman, not only for the society, but personally. The paper he has read gives a clincher to the one which I had the honor of reading before this society last year; and I hope that Dr. Atkinson, who was to have opened the discussion of my paper, will open the discussion of this one.

Dr. Atkinson—It is difficult to add anything to the trend of the research and of prophecy that we have been listening to. I have nothing but commendations for the general principles of the paper and for the statements made; and the only criticism I have to offer is that the verbiagé does not always fit. A musular brain is that which is not known to my anatomy; and I would suggest

that muscular be changed for robust, or something that would more nearly comport with the magnificence of the portrayal and the beautiful correlation of aphorisms that indicate a research very uncommon.

That we all do live upon something that he has referred to, but not named, is generally accepted, I think, by all thinkers; and we are near the time when such deep philosophical disquisitions shall not only be tolerated, but received with delight and in some measure comprehended.

But all that is swallowed up in the immediate question, what shall be the next step; and the fact of each individual having to take the step that shall best comport with his particular environment, and that these communities that have been referred to may be sufficiently alike to walk together in obedience to the law that governs the food supply, and the preparation of the food when it has been attained, will enable us to come a little nearer to what is now engaging the minds of the so-called micologists, those who are studying the earliest embodiment of this power that has been so difficult to define, and the understanding of which is absolutely necessary to the comprehension of the question of food and nutrition. A late writer says that the function of the white blood corpuscles, the leucocyte in the mammalian circulation, is to eat the microbes that are inimical to the organization, and thus bring about a tolerable condition so that the other modes of the stored radiancy may awaken the primal steps in the process of building and nourishing the organs of the body.

When, some years ago, a few inspirations were spoken of by your humble servant before a body of this kind they would say, "Come out of the cloud; talk practical sense; we do not want any of these vagaries;" but before they would be through they would refer to the very same relations that we are trying to unravel in order to understand what our duty is.

There was something said about honesty and a commercial age. Commercialism is right if you use it right; and so is every other condition if we only know how to meet it. But how do we know how to meet it if we do not agree in our understanding and interpretations of things by referring back to the power that produces them?

As to the earth being once clothed with ice, it is altogether

unphilosophical and contrary to true evolution, the stages of which do show us a great many things that have been attributed to the Devil's Mountain, which, if we had such a mountain, we might have sympathy with him, and work as brothers together in our investigations, and know that we know so little that we ought to be ashamed to say that we have grasped the problem of organized beings and settled the question of embodiment of soul; because in every human soul there has been planted both intellect and affection; there is a sense of brotherhood and of righteousness; a sense of doing to others as you would be done by; and that is not what has been called in this paper physics. I wish to God the word physics could be expunged from our nomenclature. There is no physics without that which produces natural organisms. There is no organ without that which gives the lay-out for the organ. There is the spirit within it—though it escapes us when we are not able to do anything more than mentally grasp at it—which is the doing power that reveals the truth to us.

I hope this paper will be discussed by the society, and all done that can be done to engage the stored radiancy that is somewhat obscured in it, so that we may be illuminated by an understanding of the laws that govern individual existences that have in them the intellect and affection that raises this question of morality.

Dr. Thayer—The important question raised in the paper seems to be: What shall a man eat thereby to have good mental and physical organization? I cannot give any better answer than that which is recorded in the Bible; where it speaks of that land which the people of Israel were going to occupy as filled with corn and wine and oil, and flowing with milk and honey. If these are the things which were good for men to enjoy in those days, why not take the old Bible and settle the matter?

Dr. Stockton—Dr. Codman spoke in his paper of the crude diet of the old New Englanders; how they lived on the plain foods of that time; and we know that they were mentally a grand race, we know what has sprung from them, but we do not know much about their teeth. I would like very much to learn something about them from the doctor. I consider this an important and practical question, one that brings us down out of the clouds to the comparative results and desirability of living on the plain, coarse foods used at

that time, and the diet which we should have to-day. I doubt very much whether the race of to-day is mentally any stronger than they were in those old New England days. They were grand men.

Dr. James Truman—Mr. President, I was very much interested in the remarks of Dr. Codman, and I was glad that he brushed away all the old ideas that have been handed down through the books, and based his remarks entirely upon scientific research. He gave the opinion that food has very little to do with the character of the teeth as we find them. When I examine the teeth of those who live in the cold regions, as the Esquimaux, who live entirely upon a fatty diet, I find them of good character and structure; and as I pass to other regions, where the people live entirely upon a vegetable diet or a fruit diet, I find their teeth of the same general character as those of the meat and fat eaters. Also, when we examine the teeth of the early races of this continent, or in any quarter of the globe, we find the same character of teeth associated with the greatest variety of food habit. The question arises whether a meat diet or a vegetable diet is best for the human race. I hold that we may eat almost any form of food, but that we are not built for a meat diet. This is my positive conviction. I know that it is contrary to general opinion, and the shape of the teeth, especially of the canines, is cited in opposition to it. It is a fact that the human animal has comparatively smaller teeth than many of the herbiverous animals; that does not indicate a meat diet. We now live upon a mixed diet, but I think the time will come when the human race will refuse to eat anything that "has just died," as Dr. Atkinson puts it. To my mind the whole human race is gradually advancing from a coarse stage of existence, from a time when the flora and fauna on the earth's surface were rude and coarse. Yet that is an expression which we cannot properly use in this connection, because there is nothing coarse or fine in nature; but still there is a difference in the grain, not only in organized beings, but in vegetables that then existed; they were coarser in grain and coarser of organization than those of the present, and probably those of the future; and the reason, I think, lies in the fact that the food of those animals and vegetables was in a comparatively coarse and crude condition. The earth has been going through a refining process, as it were, and we find a different race of animals and a different race of men; and this change will go on until that condi-

tion which Dr. Codman has spoken of will come, when the earth will be peopled by a race of men and women who will not only not eat meat, but will probably be so spiritually improved by the better food taken into their systems that they will be an entirely different race from that which now exists. I believe that all nature points to that result. I believe that not only this earth, but the great series of worlds, every one of which is, or will be, peopled similarly to ours, must eternally advance toward the good in the refinement and elevation of the races which exist upon them.

Dr. R. B. Winder—MR. PRESIDENT AND GENTLEMEN:—I can speak in commendation of this paper, as I should in regard to everything that involves earnest scientific research. That our race will eventually feed only upon grain and fruits I am very much disposed to doubt. That food stuffs have an influence, both upon plant and animal life, is a well-established fact in physiology. We all know the decided influence and effect of coloring matter in the food stuffs of animals. Whether meat or vegetable food stuffs is to be the food of man in the future is a question which the future alone can decide. That we are not at present intended to be strictly graminivorous, we have abundant evidence, I think, in the anatomy of man. All those animals which live exclusively upon a grain diet have a series of stomachs. Man has but one; and every animal with a digestive apparatus that is very similar to ours is omnivorous in its food habit, so far as I have gone in biological research. So, reasoning from analogy and from the anatomy of man, I could not arrive at any such conclusion as that the food of the race will eventually be grain and fruits only.

The question which Dr. Stockton asked Dr. Codman is a very pertinent one, and I would like to have it answered, because I have been told by much older gentlemen than Dr. Codman that there has been a change in the structure of New England teeth. I have been told that, over and over again, by our old and honored brother, Dr. Riggs, of Hartford, Conn. But to say that our food stuffs control us is to go into a discussion of the chemical assimilation of food stuffs. The same food stuffs produce in different animals very different epidermic structure. The teeth belong to the epidermic structure, so that, while food has an influence, it does not control. We know that in the half-breed Indian, the child of an Indian mother and a white man, when there has been no

change of climate nor of habits, and also no alteration in food supplies, there is a most material difference in the structure of the teeth. There we have to combat, the moment the chain is broken, that very troublesome thing, heredity, of which we know so little. I have given considerable thought during the past fifteen years to this subject, and there seems to be a debateable ground, where the facts rise and rebut each other, leaving you in a labarynth of mystery in regard to the matter, which, up to this time, no man has unraveled. There is not enough known about it to make much impression upon the general public. If we reason from analogy, from the food stuff which the infant takes, we would conclude that our diet should be animal as well as vegetable. If we are to draw any imaginary deduction from the character of the food which nature first givest to the child, we must inevitably come to the conclusion that man is not to be sustained without a certain amount of animal food. But take any avenue, and pursue it as you please in this direction, and you find rebutting testimony, and you are bewildered.

Dr. Bailey.—I have been very much interested in the discussion, and although it is a subject to which I have not given as much study as some others have, yet I have considered it somewhat. Dr. Winder has expressed very fully my thought upon the general subject of a mixed diet.

Some of the points made by Dr. Codman in his paper have raised a question in my mind. He speaks of certain animals presenting perfectly clean teeth, from the fact of their food being so simple that the tongue and the fluids of the mouth are able to cleanse the teeth. We find that condition in animals in their natural state. The teeth of the carniverous animals are as clean as the teeth of the herbiverous animals. They are as clean as the teeth of omniverous animals. All animals except the human eat their food uncooked; and I think the soft, glutinous matter of cooked food that sticks to the teeth has much to do with their decay and loss. If we take the human animals that present strong and clean teeth without the aid of tooth-brushes or powders, we find that they live very much in a state of nature; they are not congregated in cities or villages; they are not busied with intellectual pursuits, but they live an out-of-door life. The Rev. Mr. Murray, when he hailed from Boston, gave us some account of life

in the Adirondacks, and he tells a story of a young man who was so debilitated when he went there that he could not get into that wild country without being carried, yet, after a residence of a few months there, he was able to endure the most fatiguing expeditions on foot without aid. When the young man who is debilitated by city life and heredity goes back to a more natural state of living, he finds that his body is built up, so that it can perform its natural functions. And it is because of these facts, which constantly come to our knowledge that I am a great skeptic in regard to the doctrine that our food has anything to do with the building up of our spiritual nature. We know that all parts of the body, the brain as well as the bones and muscles, are built up by the food which we eat; but I doubt very much whether the spiritual nature of man is so built up or changed, except our habits of taking food become gross and animal. There is a tendency to the animal nature and to the spiritual nature; but those tendencies are governed more by our habits than by the nature of the food which we take.

Dr. Sudduth—I would like to say a few words in regard to the connection of food supply with the cleanliness of the teeth of animals. How about the teeth of dogs? They are generally clean. They have the same cooked food that their masters have, and yet there is no decay in their teeth. There is only one article left out of the dog's diet, and that is sugar, that we take ourselves.

The omission of sugar makes the only difference between the food of the dog and that of his master. Now, from sugar comes fermentation; and decay is without question the result of fermentation and the production of lactic acid. The difference in the condition of the teeth of man and the lower animals is largely due to that difference in their food.

Dr. Watkins—Dr. Sudduth has spoken of dogs' teeth being always clean. I have noticed that the dog which is made a pet of and kept in the house and fed from the master's table invariably has a bad breath, and I have frequently seen tartar on their teeth also.

President Brown—Last year I wrote on this same subject myself; and I expected Dr. Atkinson to pitch into me, but he did not come. Now he makes the point that we should look at our organization to see what kind of food we should eat. That is out of the clouds. The position that I took in my paper was that we should try to decide this question by looking back to the natural or

original food of man, and not by what we see to-day. In the glacial period the food of man was changed. I think there is no doubt but that before that age it was a fruit diet. It was then changed to an almost carniverous diet; and as the earth has changed we have become omniverous. The question resolves itself whether we are living correctly as omniverous animals or whether we should be fruitiverous. Dr. Winder says graminiverous animals have several stomachs, and that therefore man, who has but one, cannot be considered a graminiverous animal. I have never heard anybody claim that we are graminiverous, but it is exclaimed that we are naturally fruitiverous. In comparison with other animals we of course come nearest to the ape; the anatomy of the two is almost exactly the same; and if we take that as an example, the argument is surely in the direction of the fruitiverous theory.

Dr. Ottolengui—Dr. Watkins is right in claiming that the dog loses his teeth just about the same as we do when fed upon the same food. I have in my house a pet dog that lost his six molar teeth from pyorrhœa at about two or four years of age. It seems to me that the men who make a business of breeding dogs have really advanced to a very high point of knowledge on the subject of breeding those animals, and the perfecting of their several qualifications. They can produce almost any kind of a dog they may want. In the first place they pay a great deal of attention to the matter of heredity.

The matter of food supply has also been carried to a fine point by the breeders of dogs. The dogs are fed upon only one kind of food, and that is dog cake. It is not at all unpalatable to man. It is baked very hard and the dog is made to eat it dry. It is made of ground bones and a soup made of beef meat, and, I think, corn meal. Dogs fed upon that after two months will show a very marked improvement in their coats. They are fed only once a day, and are then given all they want to eat. I know persons who follow the same habit of eating only once a day and taking food that requires considerable mastication.

Adjourned until 8 o'clock P.M.: Dr. Codman's paper to be taken up for discussion.

THURSDAY EVENING SESSION, JULY 18, 1888.

The roll was called by the Secretary.

The discussion of Dr. Codman's paper was taken up.

Dr. Stockton—We know that a great many people, when they come to this country from foreign countries, have very good teeth, and that in a few years after their arrival their teeth melt away. Is that due to the influence of diet, or to the climate of this country? Can Dr. Codman answer that question?

We know that the teeth of children here require more care between the ages of 10 and 20 years than at any other period. We are also told that the teeth of people who come from other countries, especially the peasant class, do not decay after they have been here until between the ages of 20 and 25 years. What is the reason of that? I would like an answer to this question, also, if the doctor can give it.

Dr. Codman—I am not able to answer Dr. Stockton's question as to whether the diet of the New England people, which I claim has improved, has had its effect on the teeth; but I think we all agree that whatever produces better constitutional effects produces better teeth. And I think dentists are hardly judges on the question of whether teeth have improved or not, because we see the decayed teeth and not the good ones as a rule; the best teeth keep out of our offices generally, and we are not so good judges of that perhaps, as some outside individual might be. I cannot say that the teeth of the New England people have improved in the last sixty years. I do believe that the diet of the New England people has had its effect, and that the consumptive tendency has been checked. There are not so many consumptives as there were in the past. And that is as much as to say that the food they eat is better assimilated.

With regard to foreigners coming here with good teeth and having them decay soon after they get here, I think possibly there is an error there, and that when they come here they only think they have good teeth when perhaps they have not. I find servants oftentimes coming to me with good looking teeth, which are really decayed, and it is only a question of time when they will come into the general average. You know also that there is a very wide departure when they get here, from their European diet. Nearly all the Catholic population of Europe are limited in the days when

they may partake of animal food; one day in every seven it is prohibited, and there are six weeks in Lent when they cannot take it. Further than that, there are those who cannot get animal food, neither can they get sugar, tea, coffee, etc. I have been told that in some parts or Germany sugar is so rare an article among the common people, that when they get a piece of it they carry it upon a string and each one of the family takes a lap at it. Here instead of considering it a luxury seldom tasted, they go into a barrel of sugar with savage appetites, and they eat it plentifully as well as other things which they were not accustomed to in their own country, and that unaccustomed food produces a disturbance of the system. Even the simplest things taken by a person that is not accustomed to them will often cause disturbance to the system; and whatever disturbs the normal condition of the system has its effect upon the tissues.

Something has been said about dogs, and the question was answered pretty fairly, but I have a patient who says that when his dogs are in the country they never have any tartar on their teeth, but when they come to town and live again on the food from the family table their teeth become covered with tartar. The reason of that is that in town they have no bones to knaw while in the country they scratch and root around and keep their teeth clean.

We must rid ourselves of the prejudice which is abroad among scientific men in regard to the difference in foods. There is not a great deal of difference between the mutton which you eat and the vegetable food which the sheep eat. The difference is mainly that the sheep ate the vegetable food first.

It was not many years ago when it was thought to be almost impossible for a person to live without animal food; the man was thought to be crazy who spoke of such a thing; but as our observation increases our ideas advance, we know more of the habits of other nations, and we find that some nations live almost entirely upon vegetables and fruits. We also know that some of the strongest people who have lived in the world, and who live on the Mediterranean, would take a package of three to six hundred pounds and trot off with it on their backs over the country, and they eat very little or no meat. The Japanese boys will take a lady in a chair and trot away at the rate of six or seven miles an hour, and they live almost entirely upon fruits and vegetables. But my idea

is not, as some gentlemen have suggested, that our normal diet is grain, but the man is intended to be fruitiverous. Nature hands your fruit to you in the most beautiful shapes, such as the peach, and the plum, and the walnut, which are held out to you by the tree, and they are very tempting and very wholesome foods. I thank you for your kind reception of the paper, and I am pleased to be with you on this occasion.

Subject passed.

EVENING SESSION.

Dr. Sudduth showed with the magic lantern a large number of photo-micrographs of sections of the tissues of the lower animals in various stages of embryonic life. He prefaced his remarks with a graphic description of his idea of the beginning of life on the face of the earth.

After describing the pictures shown, Dr. Sudduth said: "In showing you these various stages of development of life from a microscopic point of view, I have tried to bring out the idea of the separate entity in cell life; the history of the development of the individual is simply that of the development of the individual cell. The ova is nothing more than a separate cell that has the power of reproducing itself. It exemplifies the division of life in the cell. All the changes of the body spring from these separate entities that we find here represented.

"All change must begin in these ultimate principles. We call that the cell an ultimate principle because we do not know any other. These cells spring from pre-existing cells. The *de novo* origin of life is impossible. The only way in which life can be developed is from pre-existing life. I want to call attention to the fact that the green plant was the first point in the development of life. I believe the green plant was produced by creative fiat. The development of the green plant *de novo* is also an impossibility. One life descends and blends into the other life. Man is a creature of heredity and environment, subject to the changes and vicissitudes of life, and his nature is changed and modified by the circumstances under which he exists.

The question of diet was brought up to-day. We are creatures of environment, but we have the power of modifying our environment to a greater or less extent. That man is changing all the

time cannot be questioned. We have evidence of that as far as we can go back in history. We adapt ourselves to different circumstances, and there has been no study in the world's history that promises more at the present day than that of personal and corporate hygiene. If we can better our environment, we better the conditions of life, and thereby lengthen life. Physiological chemistry is taking the lead to-day, and the man who can take up that study and follow it out will give us the most light in the future. There has never been a time in the world's history when we have had so much promise of benefit to mankind as at present, and it is largely due to our increasing knowledge of what true hygienic conditions are.

Dr. Atkinson—We have seen a very beautiful representation of the development of tissues, and have been told that there must be a cell for these changes to take place. Now there is a correlative of that, that if the cell grows from its nucleus it must naturally have increment of substance to increase the size of that nucleus, and to make the division that has been portrayed as actually occurring in the rabbit's egg, and in the unimpregnated chicken's egg. How came about the possibility of providing and elaborating the new impulse to that egg, that had to be fed to a certain point of ripeness to make it possible to establish a line of sympathy between the individuals, so that when thrown together in an undifferentiated mass, they become organized into semens, the combination of which produces the veritable germ.

We must understand that fine feeding, or else we are simply beating the air and talking about beautiful things without really following the line of evolution of the radiancy that is stored in these little bodies that constitute the papulum, the differentiations of which give us the classification of creatures. Hæckel said that the protista was a kingdom between the vegetable and the animal kingdoms.

We must be in our intellects and affections on a plane of fraternity and love of the truth, and until we do we will not make the progress that we should, even after we have had such a display as we have had to-night.

They tell us of chaos. We can never travel towards the real foundation until we comprehend chaos. Chaos is the conglomerated mass of planetary substance that is capable of being devel-

oped into planets and planetarian inhabitants, the discriminations and divisions of which constitute the classifications in natural history. We want to give a specific alphabetical statement to students who attempt to investigate these things. First chaos, next protoplasm, next protista, then the mineral kingdom, the typical form of which is the crystal, next the vegetable kingdom, characterized by the cell, as the doctor called it. The function of the cell is to vegetate. Then we come to the animal kingdom. What is the principal example of that? It is the corpuscle. It is not a cell. It is a cell and something more; just as the first protista was chaos and something more; the stored radiancy embodied in the planetary substance out of which all the body of the planet and its inhabitants take their origin.

Dr. Sudduth—You said the corpuscle was more than the cell. I want to get your idea of what you term a cell.

Dr. Atkinson—The cell is the primal element of vegetable activity. It is simply a lump of jelly that is non-nucleated. I have written upon this subject, and I am pained to say that not a single man has manifested the disposition to read understandingly what I have said. Some learned men have said I spoke ambiguously.

Dr. Thayer—What is a corpuscle?

Dr. Atkinson—A corpuscle is a little body.

Dr. Thayer—How does it differ from the cell?

Dr. Atkinson—It differs in its promise as a body.

Dr. Ottolengui—The paper teaches us that these cells are individuals. Dr. Heitzmann teaches that they are nothing of the kind.

Dr. Atkinson—It takes two lies to make a truth apparent. They are both, and they are neither. That was undoubtedly at one time a globular body (referring to the screen). That is developed here first. It is globular; then they run together and become columnar; then they press against each other on all sides and flatten and become cuboidal. Then all outside of that (referring to the screen) is squamus or pavement epithelium. As they approach the surface, the flattening represented here becomes more marked, and they are ultimately shed as dry scales with a central nucleus. That may be round, cylindrical, cuboidal, or squamus, according to its age and mission it is fulfiling. They have muddled the truth about that, but I do not think he (Sudduth) did. Take that and

transplant it anywhere where the epithelial body or malpegian layer has been taken off, and you have enough left of the capillary layer and the true skin, cutis vera, and it is capable of feeding and will make a beautiful epithelium and a new surface to the skin. The dandruff that we see on persons who are poorly groomed is shed epitheliel scales. We should understand how the feeding process goes on, and how in the process of digestion something is laid by for future use, as we bank some of our money; and if we would observe the process of respiration we would have a key to unlock this mystery. We get an oxide when not breathing. When we inspire and bring the atmosphere into the air vesicles a transition takes place. And what does that do? Just 4 per cent. of the oxygen that has been grasped by the lungs is appropriated, 96 per cent. is killed, is not fit to be used until it has passed the vegetable kingdom to be rejuvenated by discharging its carbon and taking in oxygen. The next step is to get rid of the breath which is expired. If we were learners and would learn the lesson that this example teaches us, it would give us a key to unlock every one of the modes of nutrient motion from the crystal to the cell and the corpuscle, the tissue, organ, system and consciousness. But I have expressed the entire roll from A to izzard.

Dr. Ottolengui—I do not understand your answer.

Dr. Atkinson—What is our body? Nothing but a single substance, an amœba, a mere big lump of jelly that differentiates into various tissues and organs. It is proved by many examples in the practice of medicine, in physiology, and the researches of the micologist and naturalist. The alimentary, respiratory, and urinary tracts are plainly laid out in the human amœba as foresteps to the perfect organs of the body; they are made up of indifferent corpuscles that are nothing but lumps of jelly. Then heredity is involved, and under favorable circumstances there is produced a similar ova to that from which we are told that body was developed. But where did the first one come from if this is true?

Dr. Sudduth—It was created by the power behind us.

Dr. Atkinson—He uses the word creation. The idea is right. "In the beginning God made man in his own image; in the image of God made he him; male and female created he them." There is first a single cell, holding the potentiality of father and mother.

First is the maternal or love side; then the father, or wisdom; and then in the ongoing of these two, love and wisdom, the divine logos gives form and conformation to all planets and planetary inhabitants.

The potentiality that resides in the human amœba, that is the ovum already vivified, lays the foundation of the three embryonal sheets, so-called, the epiblast, hypoblast and mesoblest, the enfoldings of which give us the entire system of primal parts. Every time that you have a reproduction of tissue it has to go through that same process that I speak of. First, indiscriminate chaos; then completely digested food or peptones; then protoplasmic mass; then the embryonal corpuscle, out of which all the tissues arise, as exemplified in all reproduction of structure where there is fracture of the tissues; if they are favorably situated, they repeat the embryonal condition and series of changes, so that they are undistinguishable from the original material, and are not distinguishable as scar tissue; but where the circumstances are minus in organizing power, the white connective tissue corpuscles prevail to such an extent as to make the dense scar tissue that is known to prevail so extensively in burns and other mutilations, and which is less endowed with organizing power, and most liable to retrograde when under debilitating conditions of constitutional origin.

Dr. Sudduth—What are corpuscles, and what differentiates them? Are we able to see a corpuscle?

Dr. Atkinson—Yes. These (referring to screen) are corpuscles, and may be the beginning of what you call cell division in proliferation of the new structure. You said they were nucleated cells. These little spots are neuclei. They are being merged into one another; so when we lift the connective tissue or epithelium from the papillæ of the true skin, we may have normal reproduction of the structure, or that which is less endowed and called scar tissue, or simply white connective tissue corpuscles binding the fractured parts together. These are all limitary tissues. When they are destroyed you get union between the horny layer, which is the true protection against infection.

They do not know what Heitzmann meant by saying that all protoplasm is organized. He has shown that in the red and white human corpuscle, in which the reticulum of what he calls living matter embraces the fluid or non-living portion of the corpuscle. Our

American investigators have looked and looked and still they look to the east, to Europe, for the interpretation of these fine questions, but you have followed the line of investigation and treatment of the disease of Frederick III under Mackenzie, and the German physicians have seen that no single one of them made any specific reply to the question of whether the formation was or was not malignant; but they hedged and quarreled among themselves, and Mackenzie stands the only clean-cut man in the lot. He said in the start that he did not know whether it was malignant or not. They cut some tissue and sent it to Virchow, and he said he could not find anything in it that would warrant him in saying it was malignant. After the patient died then they decided that it was malignant cancer. They give us the old saw respecting carcinoma; if the patient dies, then it was cancer; if he don't die then it was not cancer. So you never cure cancer. There is no microscopical demonstration that shall teach us whether a tumor is malignant or not. It is not possible at this day to determine whether a tissue is malignant or non-malignant by microscopic means; and I do not hope to see it until we get deeper into physiological chemistry and understand what is the constitution of a chemical individual, what is aptomaine, a poison, or a leucomaine, and know more of the finer foods, to the tissues than is known to physiologists.

Dr. James Truman—Dr. Sudduth stated that there is no new life, that all cells come from cells, and all life comes from life, and he spoke several times of creation as though at some period there was no cell; that it was created. Now if all cells came from cells, and all life comes from preceding life, then there must be an eternity of life, a continuous circle, and there is no necessity of creation at all. I don't understand his idea of creation under those circumstances. It seems to me unscientific,—unless there has been a beginning there never can be an end.

Dr. Sudduth—This question is a very hard one to answer. It is a question that is outside of demonstration. I have tried to-night to confine myself to that which can be demonstrated. The beginning of life can only be reasoned out. We know that we have passed through a stage of evolution. Spontaneous generation was called out and followed up, but did not go far until it was proven to be a chimera. We find that life is persistent throughout the atmosphere. There may have been a point, as evolutionists claim,

in the existence of the earth when the circumstances were just right, and when spontaneous generation of life was possible; but all our analogies teach us the opposite. So we come back to that creative fiat that I acknowledge, and while the eye cannot penetrate the vale it recognizes a creator behind. This life is not eternal. Dr. Atkinson has misunderstood me. I have argued that behind all this there is something that we cannot fathom, which directs and guides this form of life. I think physical life is limited.

Dr. Ottolengui—I understand that Dr. Sudduth claims that these cells are individuals which can reproduce themselves, just the same as a plant which throws off a seed from which comes another plant entirely separate and distinct, except in the matter of heredity. Dr. Heitzmann teaches the opposite. He says that those cells, instead of dividing into two separate parts, simply grow out until the middle of each collapses, and by the time it has collapsed the two bulging sides are as large as the original cell was, and that process goes on and on, yet they are the same original cells. I want to know exactly what evidence he has that Dr. Heitzmann is wrong and that he is right in the matter.

Dr. Sudduth—We have here a display of the Malpegian layer of the skin, that makes the lining membrane of the mouth. Here is represented the epiblast, the outer of the three layers, and this represents the mesoblast, or middle layer. This Malpegian layer is made up of small granular bodies, which are called nuclei. They are the infant cells. Within each are seen numerous dark granular particles, which we call nucleoli. All cellular change begins within the nucleus by a re-arrangement of the nucleoli, by a process termed karyokinsis. The nucleus then divides; after which the cell body divides. The process of growth begins with the nucleus, and not in the cell body. This is well shown in certain pathological conditions, where the cell body fails to divide, and we have giant cells formed. There is no question about the precise method of cell growth. The difference between Dr. Heitzmann and myself is that he does not acknowledge these to be separate bodies. He says that they are all one mass of protoplasm.

The subject was passed.

The election of officers was here taken up, and the following officers were duly elected by ballot:

President, Dr. Henry A. Hull, of New Brunswick; Vice-Presi-

dent, S. C. G. Watkins, of Montclair; Secretary, Dr. Charles A. Meeker, of Newark; Treasurer, Dr. George C. Brown, of Elizabeth; State Prosecutor, Dr. Charles A. Meeker.

Executive Committee: Dr. Oscar Adelberg, of Elizabeth; Dr. B. F. Luckey, of Paterson; Dr. C. W. F. Holbrook, of Newark; Dr. Richards or Adams.

Board of Examiners: Dr. J. Hayhurst, of Lambertville; Dr. Fred. A. Levy, of Orange; Dr. Frederick C. Barlow, of Jersey City; Dr. James G. Palmer, of New Brunswick; and Dr. A. R. Eaton, of Elizabeth.

On motion of Dr. Levi, it was resolved to hold the next annual meeting at Asbury Park.

Adjourned until morning.

FRIDAY MORNING SESSION, JULY 20, 1888.

The roll was called by the Secretary.

Dr. W. F. Rehfuse was proposed for active membership, sponsors Drs. A. S. Burton and Fred A. Levy. Referred to the Board of Examiners.

The Board of Examiners reported favorably upon the application for membership of Dr. W. H. Rehfuse; and further reported that the application for membership of Dr. Seymour was for the present withdrawn.

Dr. Levy, Chairman of the Legislative Committee, asked for more time, and to be allowed to report at the semi-annual meeting. The request was granted.

Dr. Hull, Chairman of the Executive Committee, reported progress.

Dr. Levy, of the Special Committee on the President's address, read a report of the Committee in the matter of the proposed recommendation to the dental colleges, and Dr. Sudduth's amendment thereto.

Dr. Meeker moved that the words, "The New Jersey State Dental Society," be inserted in the report, making it distinctly the recommendation of this Society.

Dr. Hayhurst remarked that if the Society adopted the resolution it became a resolution of the Society.

Dr. Stockton—I don't quite get the idea of the two years' study, of at least seven months each year, in a college.

Dr. Levy—It says three full years of study, two of which shall be spent in some regular dental college.

Dr. Stockton—It does not say they shall attend three full years in a dental college?

Dr. Levy—No.

Dr. Stockton—What we wanted was three years in a dental college. That is what the President meant in his address, that the dental colleges should extend their term to three years. We want an advance in dental education, and this seems to be no advance.

Dr. Watkins—The President's recommendation was simply a suggestion to the Society to take some action in the matter; and it is believed that if we attempt to take too large a step we will not be able to reach anything, but may go down and not get across the gulf at all. It seems to me that the spirit of this resolution which the Committee have offered will cover the ground and be acceptable to all. At present our colleges are all at loggerheads; some of them have five months' study, some six, some seven, and others nine months in the year; there is no uniformity about it, and the result of it is apt to be that the student selects the college that will graduate him in the least number of months or the shortest space of time. There is no sympathy between the colleges on this point. Now if we recommend three full years of study in a college, the colleges will not meet us, will not adopt it at the present time. They have not yet arrived at the point where they are prepared to do that. But if we advance a step further now towards what we want, then in two or three years perhaps we can advance another step. At the present time the student is required to attend lectures two years, and I believe the minimum course is five months. This resolution recommends that the student shall study dentistry for three years, at least two years of which must be spent in a dental college, and that is an advance of one year. As it is now, he may be graduated after two years' study. Then if we can make the minimum course seven months instead of five, that will be another step. The next step will be three years of nine months each. It seems to me that if our National Board of Examiners can get the National Board of Faculties to accede to this advanced step that we now ask for it is about all we can hope to accomplish now, and that in three or four years more the other step may be taken; while, if we attempt too much now, it will be a failure.

Dr. Stockton—It seems to me that we will gain nothing at all by the resolution. A young man desires to be a student of dentistry; his name is registered with his preceptor, and he gives more or less time, as he may please, to the study; he has registered for a year and it is counted in his favor whether he studies or not. A great many will register to meet the law of the case, as they did in New York when the present law was about to take effect; and they were no more dentists than the waiters in the dining-hall here. And it would be so in case this recommendation was adopted; they would register with some dentist, after a year they would go to college and spend their two years and be graduated, and there would be no advance in the line of better education. We take a young man who has spent a year in a medical college, and he spends two years in a dental college and graduates with a percentage of one hundred in everything perhaps; I can name a young man who has graduated with a percentage of one hundred in every study except one, and he had been through a medical college, a splendid young man in every respect, of good intellect, and yet he knows nothing practically about dentistry. Now if we can make the term three years, of seven months each, in a dental college, or five even, they will come out knowing more than they do under the present arrangement. If the colleges are not prepared now to give us this extension of the term we may as well go on in the same way that we have gone until we can prevail upon them to do it. Under this proposed rule we would be in exactly the same condition that we are in to-day, according to my friend Watkins. This is no advance at all. Let us take the step that other state societies have taken and let us have our action uniform. The Illinois State Dental Society adopted three years as their recommendation to the Board of Dental Faculties; the Massachusetts State Dental Society recommended three years, and I think that all the resolutions that have been passed by State Societies recently have recommended three years study in the colleges. If we recommend two years, with a previous year's study somewhere else, the recommendations to the colleges will be different and not harmonious, and they naturally will say that the dental profession is not united on this question, and are not ready for this step, and we will not get any advance toward better dental education. I would prefer that this resolution in its present shape should not pass at all. Let it lie over a year and see what the

general feeling is in regard to the matter. It would be better not to pass it than to have it in conflict with the recommendations that have already gone to the National Board of College Faculties.

Dr. Sudduth—Dr. Stockton is entirely misinformed. The resolution is in exactly the same words as that passed by the Illinois State Dental Society, except that we extend the term two months, making it seven instead of five months. It is the same as that which was passed by the Massachusetts and Connecticut Valley Societies, and the same resolution has gone to Portland to be passsed there. The resolutions are uniform except that we ask for seven months in the year instead of five.

Dr. Stockton—If the first year means a year of actual study instead of a mere registry, I would favor the resolution; but they will merely register to comply with the requirements of the law.

Dr. Sudduth—You cannot enforce that on the students. You can require them to make affidavits that they have passed one year in a dental office, and that is all you can do. As it is now, a young man can apply to a college for admission without any preliminary study or any knowledge of technical terms, and therefore the first course in college is almost lost. It will be one step further to say that the first year shall be spent in a college instead of with a preceptor.

Dr. James Truman—Mr. President, the National Association of Dental College Faculties has had this matter before them every year for the last four years, and there has been an agitation looking to the increase of the time of study to three years instead of two; but there are practical difficulties in the way of this increase, and Dr. Watkins has stated them exactly, in my opinion. There are many weak schools which do not feel that they can make this change, and there are some schools which are connected with medical colleges whose term is five months, and they could not change to seven months because the college would not be open more than five. Therefore I think we cannot possibly carry the three year course through at the present time. This thing must advance slowly, and if you pass a resolutian of this character, I think it will receive more consideration than one recommending three years in a dental college. I think the Association of Dental Faculties will increase their term to at least six months, perhaps seven. This they can do, but to add a year to the college course also is impos-

sible. You would better ask for nothing than for something you cannot get.

Dr. Winder—Mr. President, as a member of the National Association of Dental Faculties, I concur entirely with the statement made me by my friend, Dr. Truman, of the University of Pennsylvania. No matter how much you may desire this step, you cannot go ahead of the necessities of the time. The medical schools of the country, a large majority of them, are making no such demands upon their students. It is a question of life or death with some of them, and you have first to educate the public up to the necessity for this step. As far as the preceptorship is concerned, you all know that it depends largely upon who the preceptor is whether the student is better or worse educated. Allow me to select the preceptor, and I do not care much about the length of the term. But you cannot draw the line of discrimination between this preceptor and that preceptor. I can assure this meeting of the truth of Dr. Truman's remarks on this subject. It is a question that has been brought up from year to year; but there are difficulties in the way which you do not understand, and some of which he has stated. I hope this resolution will not pass. I hope the New Jersey State Society will not attempt to dictate to or handicap the colleges. The colleges are doing all they can do or dare do in regard to this matter. I think it would be wiser to leave it to the integrity and wisdom of the colleges themselves, than to be passing resolutions in State societies, one recommending one thing and another recommending another. The three years' course cannot be adopted at this time, nor can the seven months' term. There are some colleges connected with medical schools which have no existence for that time, and it would be necessary to revolutionize the medical schools. You want seven months' study in a year, while a great many of the medical schools of the country do not demand over five months; I think the majority of them do not. You cannot push dentistry so far in advance of public opinion, when the medical schools are doing nothing of the kind. This question will come up before the association this summer, and we are trying to harmonize and do the best we can. They are demanding a preliminary examination to ascertain whether the student is sufficiently advanced to understand the technique of the lecture course. And there is a great difference of opinion now

among educators upon one question. It is generally believed that the lecture course is sufficient now, and that the entire time should be devoted more, perhaps altogether, to a better practical training. There are long term schools and short term schools in this country, and you will find that the one gives as many lectures as the other. The long term schools do not have so many lectures per week. So far as the lecture course is concerned, I think it is sufficient at this time; and that if we get any increase of time it should be devoted to training the eye and the hand to practical work. The colleges are considering this question, and they have a disposition to move as rapidly as is possible in the circumstances. I hope this resolution will not be passed, nor any other resolution instructing or handicapping the colleges in that way. I think it is bad policy.

Dr. Watkins—There is no uniformity at all among the colleges; they vary in the length of the course. In some colleges the course is five months, in some six, in some seven, and in others nine months; and it would seem that if one college can succeed with a long term another one can as well. It seems hardly fair that one college should be admitting students for the short term of five months and another college requiring nearly twice as many months of study. The colleges which give the longer term have as many students as they ever had with a short term. They have been more successful since they have adopted the long term than they were with the short term. I knew of one instance where a college increased the length of the term with fear and trembling, they thought they would not have students enough the first year to keep their college open, and the result was that they had just three students less than they had the year before. They changed to a three years' course of nine months and have been now running three years in that way, and they have more students than they ever had before; as many as they can possibly take care of. Last year they turned some away. I refer to the Boston Dental College. If they can succeed with a long term there is no reason why the other colleges should not succeed with the same term, or one nearly as long. The resolution that has been offered here asks for a seven months' term each year, and under it it will be impossible for a student to graduate inside of two years, whereas now a student can attend a course at one college, then take a course in another college and graduate in about a year and a half.

Dr. Winder—Excuse me, but that is not so, Dr. Watkins, and I call upon Dr. Truman to substantiate what I say.

Dr. Watkins—There was a case three or four years ago of a man who came from California and graduated at one of our eastern colleges.

Dr. James Truman—That was so, but it was corrected by the Association of Dental Faculties. It is a violation of the rule.

Dr. Watkins—I know a case where a student attended a course of lectures at a certain college, the course running until June and he then went to another college the following winter and graduated; and he came back to the first college in March and flaunted his diploma in the faces of the students who were his companions in the first course, and who had to go until June in order to complete their second course, to say nothing of the third.

Dr. Sudduth—I think it is wise and judicious to take into consideration the opinion of the community at large in this matter, and I think the colleges should court an expression of this kind; but it does not devolve upon them to adopt it. It lies with the college faculties, whether or not the course of lectures shall be extended. What we want is more time for practical work.

The resolution as reported by the special committee was here voted upon and adopted.

Dr. W. F. Rehfuse was then elected a member, Dr. Watkins and Dr. Stockton acting as tellers.

Dr. James Truman called attention to the fact that the INDEPENDENT PRACTITIONER had changed hands and enlarged its scope, and he bespoke for it the support of the profession throughout the country.

Dr. Stockton here read a paper, by Dr. Louis Ottofy, on the Preparation and Filling of Roots:

ROOT CANALS CONSIDERED IN RELATION TO FILLING AND PREPARATION FOR ARTIFICIAL SUBSTITUTES.

I desire to call your attention to a few points relative to the preparation of root canals for filling or for the attachment of artificial crowns—points of more or less importance, though often under-estimated in dental practice. We are painfully aware that not only the less positive scientific branches, which enter into the study of dentistry, are enshrouded in mist and veiled with a certain

amount of indefiniteness and unreliability; but we find that even those branches which are known as the foundation on which the others have been built, are very crude, uncertain, and in many instances entirely false. This is true in some measure of dental anatomy. Many errors in relation to the anatomy of the teeth have crept into early editions on anatomy, or have been culled from works on general anatomy, written or revised by eminent scholars in general medical sciences. The statements have been accepted as facts, and published and republished until these fallacies have become well-grounded opinions of many members of the profession.

It is not so deplorable with those subjects which, instead of being misinterpreted by dental anatomists, have been wholly or partially ignored; because, at least, if the student is not enlightened, he is not misled; but remains in a position to receive correct impressions. Dental anatomists have not given as much attention to the consideration of root canals as their present importance demands. To the dental practitioner of to-day the shape, size and probable length and location of a root canal, and the relative size of the canal to the root, is of the utmost importance—of more importance than at any time in the past. To the dentist of the future much will be clear and concise, which to the busy practitioner of the past and of to-day has been a source of annoyance, and frequently the cause of failure. For the attachment of the wooden peg pivot of the earlier times, whose application was restricted usually to straight-rooted anterior teeth, or for the introduction of fillings into the cavities of pulpless teeth, leaving the roots unfilled (a vent-hole or an abscess affording exit for the putrescent contents of the canal), a limited knowledge as to the root itself, or the channel within it, was sufficient. For the varied operations of root filling and crowns, a better knowledge of the form of root canals is essential, and a thorough understanding of dental anatomy is almost indispensable to the successful practice of dentistry.

The information dental anatomies contain in regard to root canals is generally embodied in the very incomprehensive general expression: "That the pulp chamber and root canals correspond with the general outline of the tooth." In the main this is true, and the perfect knowledge of the anatomy of the teeth seems primarily indispensable. It certainly is essential, though the shape

of a root does not always indicate the size, direction or possible bifurcation of its root canals.

That much is to be said in regard to the canals of the upper central incisors; these teeth have perhaps the most favorably-shaped roots of any, and it must be gross carelessness indeed when any manipulation within the pulp-chambers or canals of these teeth do not result favorably. The compression of the roots of these teeth, as so often met with in the lateral incisor, is so rare, that weakening of a frail root while preparing it for the reception of the pivot, or when removing decayed portions therefrom, should never be the result. The form of the root of the lateral incisor is often deceptive; relatively speaking, the root is correspondingly not as wide from the mesial to the distal surface as the root of the central incisor. The crown of the lateral incisor is relatively wider than the crown of the central incisor, and hence there is more liability to weaken the root while enlarging the canal; frequently, also, the root of this tooth is grooved on its flattened side to such an extent that much care must be exercised not to remove too much tooth-substance so as to possibly perforate or weaken the root.

The roots of cuspids require perhaps only the same amount of care bestowed on the central incisors. Their tendency to be flattened laterally should be remembered during the preparation of their canals for the reception of the pivots; neither must one forget the tendency of their roots to bifurcate, as evinced by grooves on their mesial and distal surfaces, and by the frequent division of their canals, which, however, generally unite before reaching the apex of the root.

The form of the root of the first upper bicuspid varies perhaps more frequently than that of any other tooth, about thirty per cent. being bifurcated, and of the remainder but few have a single canal the entire length of the root; most of them have either two partly or entirely distinct canals joining near the apex, and having only one common outlet; or a single-rooted bicuspid may be provided with two canals, each of which has a separate foramen.

The second bicuspid seldom varies, is generally single-fanged, having a single channel, and therefore in its relation to root filling and artificial crown attachment offers no impediments.

In regarding the lower teeth, it should be remembered that the roots of the incisors and cuspids are generally flattened. While

the roots are seldom bifurcated, the canals often are bifurcated a part of the distance of their length; but they generally unite and have a common foramen. This is true oftener of the cuspids than of the incisors.

The roots of the lower bicuspids, like those of the upper second bicuspids, offer no impediments to the ready attachment of crowns or the filling of their channels.

It is seldom necessary to introduce posts into the roots of molars, and hence their consideration in that relation is dispensed with.

As a rule the drilling, reaming or any other method of enlarging root canals, is pernicious practice and should be almost entirely abandoned. When a proper entrance to the pulp chamber has been secured, before any effort has been made to enter the root canals, the reaming or enlarging of the canal will not be found necessary. Opening into a pulp-chamber and securing an entrance into a root canal should always be done under perfect antiseptic precautions; for this purpose flooding the cavity with one to two hundred solution of bichloride of mercury has been recommended and found very efficacious. The objections to its use in this way are: its property to corrode the broaches used, thus rapidly destroying instruments, which should always be delicate; and its other property—said to be very marked—of coagulating albumen. Recently I have followed some interesting experiments conducted by Dr. G. V. Black regarding the antiseptic property of essential oils, and observing the property to be possessed in an extraordinary degree by the oil of cassia, which is very diffusible, I have been led to employ it for this purpose with very satisfactory results. In filling the roots of the six anterior upper teeth, difficulties are seldom encountered, except from the occasional small size of the canal in the lateral incisor, which can be readily penetratad by a fine broach, if no foreign substance has been forced into it.

The rule, that over-hanging ledges should be cut away, is inflexible when applied to all the teeth of the mouth, and it may be especially emphasized when the first upper bicuspids are in question; in the treatment of these teeth easy access is invariably necessary. The use of two broaches is good practice; introduce into the canal, which has been found, a large broach (as large a one that can be inserted), and while leaving it there, endeavor to find another canal by means of a fine, stiff, oiled broach.

The upper first and second molars are often the source of much annoyance, because their canals, especially the posterior buccal, are sometimes very difficult to find; frequently the anterior buccal canals are also difficult of approach. It is presumed that free and easy access has been secured. In extreme cases, when the canal cannot be found (generally due to imperfect light), it is best to arrange for a second sitting; if in the meanwhile some diffusible oil, eucalyptol, for instance, has been sealed into the cavity, it is astonishing how readily a canal is found, whose location it was impossible to determine at the previous sitting. From observing the locality in which many drill, bur or cut in looking for the entrance to the posterior buccal root canal, I am led to believe that either our knowledge of dental anatomy is meagre or else we are under the impression that the canals originate from the pulp chamber very much like the legs of an inverted tripod, from the bottom of the seat, in an exact triangle, and hence the opening is searched for too near the posterior and buccal portion of the tooth. In making cross-sections of the molar teeth at the point of bifurcation of the canals, a triangle is never found; on the contrary the tendency is toward a straight line between the palatine and anterior buccal roots as shown in Fig. 1 (root canals of upper first molar), is most often met with.

FIG. 1

FIG. 2

FIG. 3

FIG. 4

The canal will generally be found slightly back of a straight line, between these two and a little nearer to the anterior buccal than the palatine. Fig. 2, which shows the usual entrance to the root canals of upper molars, is a typical case to illustrate this point.

In filling the roots of any of the lower anterior six teeth, their tendency to bifurcate should be remembered. The use of two broaches is a good practice; one broach will often not readily pass to the apex, but a finer one sometimes follows the first broach at the opening of the tooth, passing into the bifurcated portion of the root, then entering the main channel, and passes beyond the

first broach to the apex of the root. This is also often the case with the upper first bicuspids.

In filling the roots of the lower bicuspids, their extreme length hould be remembered; aside from that, the canals present nothing unusual, are readily accessible, and easily filled.

The manner of treating of the lower first molar, and the position and form of the root canals, is perhaps less perfectly understood than that of any other tooth. It is generally described as a two-rooted tooth. Remembering that the pulp-chamber and root canals have the general outline of the tooth, the supposition that there are but two root canals is very natural. However, we do oftener find three root canals than two. The canal of the posterior root is the most accessible, no matter where the entrance to the cavity, or where the location of the cavity itself is; while ready access to the anterior canals even in badly decayed teeth must generally be obtained by the dentist, if by no other labor, at least by the cutting away of some overhanging ledge. It will then be found that whenever the canal is bifurcated the broach will pass most readily into the anterior buccal root canal, and often the existence of an anterior lingual canal is entirely overlooked. Using three broaches is a good way to determine the location and number of the canals.

Fig. 3 illustrates a cross section of the roots of a lower molar, which is not fully developed, and Fig. 4 the tooth as we usually find it. Generally a broach cannot enter at *b*, and if it has entered a canal at *a*, the other one, marked *c*, will often remain unfilled. This may not be of much consequence when the canals have one common foramen, or when the broach through one of the canals passes to that foramen; but when separate foramina exist —as I have seen them—or when the broach enters the smaller of the two canals, and does not penetrate to the apex, imperfect sealing of it is almost inevitable. In the second molars we do not find this condition, and when access has been secured the filling of the root canals is not fraught with many unfavorable possibilities.

The roots of the third molars above and below are less often treated and filled; but when this is done, the necessary manipulation approximates nearest to that required for the second molars.

The posts of pivot teeth are entirely too large, especially those of the Logan crown; on paper these posts look very well indeed,

but if the root is to be cut away sufficiently to accommodate them, there will be either nothing left of it, or at least it will be weakened to a dangerous extent.

In attaching porcelain crowns to the roots of any of the six anterior teeth, whether with or without a band, no unusual difficulties are encountered; but when the first upper bicuspids are to be pivoted, the Dutch biscuit-shaped constriction of the root should be remembered, and also the fact borne in mind that a post can be permitted to extend only for a short distance into the root. In crowning the lower teeth, when using posts, the flattened shape of the six anterior teeth must be remembered.

For the molars above or below all-gold caps are better suited, and the use of posts can generally be dispensed with.

Dr. M. L. Rhein—I have enjoyed the reading of Dr. Ottofy's paper, as I have all of his productions, very much, and I still disagree with him, as I have done for a long time, as well as with most of the Chicago gentlemen, on this question of the preparation of roots. There is no question in dental practice that interests me more than this does. It is a well-known fact that we meet with failures of other men, while our own failures seldom come back to us; they go to some other dentist than the one who performed the original operation. It has been my experience to find a great many bad results from the practice of this method of preparing roots; that is to say, depending upon broaches mainly for cleansing them, and omitting to enlarge the root canals. Cases where pulps have been recently destroyed are the most favorable ones for this method of treatment; they can introduce barbed broaches, and remove the pulp or a greater part of it. I grant that in such a case they can make a favorable operation, but even there they sometimes fail. I have seen failure in those cases which are the most favorable ones.

Failures can be produced in two ways. In removing a freshly destroyed pulp, the little filaments which are firmly attached to the sides of the canal are broken, and those filaments cannot be removed with a broach. The advocates of this treatment depend entirely upon their germicides for removing or destroying those filaments, and they do not always succeed. Then, in filling those roots, they often fail to introduce the filling material to the apex of the root, on account of the minute diameter of the canal. In those two ways failure is often produced in the most favorable cases.

Now in the case of a dead pulp that has decomposed, it is almost impossible to remove the decomposed matter with a broach; and there they depend on their germicides also to a great extent and the use of broaches. In those cases I have seen distinct evidence that the broaches used had pushed the particles of decomposed pulp through the apex of the root into the surrounding tissue, and this started up an inflammatory condition outside of the root; this disturbance being entirely due to the extensive amount of broaching that was done in the effort to pull out these shreds of decomposed pulp tissue. The practice has been very extensively adopted in this section of the country of cutting right down to the apex of the root with a Morey drill, which is so formed that it must follow the natural canal of the root and cannot penetrate through its sides. It is safe to say that this is a sure means of removing every particle of the dead pulp tissue that is in the canal itself, or the adjacent line of tissue which is so often affected by little remnants of the pulp. After using those drills thoroughly the use of germicides, other than what should always be used and never neglected, is to a great extent unnecessary. I believe it is admitted that the canal can be thoroughly cleansed by this method, but they argue that it weakens the root. On that point I take direct issue. I do not think that a root that is thoroughly enlarged in its exact center is weakened materially. All of the cases that have been brought to my attention by men who have opposed this method have been roots that were reamed out with reamers or burs not constructed on the principle of the Morey drill. I have never seen any such cases of weakened roots from an intelligent use of the Morey drill.

In the anatomical part of Dr. Ottofy's paper there was one point that I wanted to call attention to. Where he passes very lightly over the condition of second superior bicuspid roots; saying they are very easy to reach, almost as easy, I believe he says, as the anterior ones. My experience with the second bicuspid is that the root is very difficult to reach, that the canal is flattened, often times more so than even the first bicuspid. I know this is contrary to the anatomy laid down in all the old text books. We know that the second superior bicuspid is generally smaller than the first and it is generally in an abnormal state, and great care is required in following out the canal to the apex.

Another point I would like to commend very strongly, that is the cutting away of the over hanging ledges of the tooth substance for the purpose of getting free access to the pulp canal. Dentists are generally very cautious about removing too much of the tooth substance there, and that caution is often detrimental to the final operation, especially with the anterior roots of the lower molars. Never stop to consider how much tooth substance should be removed, but cut through until you get across to those canals if you want to get the best results.

Dr. Ottolengui—Mr. President, I want to take issue, as Dr. Rhein has done, with the method of treatment that has been advocated here. I think I ream out with reamers or drills 90 per cent. of all the canals that I fill, and of the other 10 per cent. more than half are canals of the cuspids, which are usually so large that we can cleanse them readily, and the palatal canals of the first superior molars. Now I think as Dr. Rhein has said, that the pulp has been recently devitalized and we are successful in getting it out so that we are satisfied none of it is left in the canal, and the canal is so accessible that we can readily cleanse it with warm water or some other fluid, and if the tooth substance itself is in a normal and healthy condition, it may be successful; but where we have a tooth with a dead pulp, whether it be putrescent or not, we can see by the discoloration of the tooth that matter deleterious to it has been absorbed into the tooth tissue. I have cut open such teeth and have almost invariably found the walls of the canal very much softened, so that it can be scraped out with a sharp spoon-shaped instrument, a bur or drill being unnecessary. If nothing but a broach be used in cleansing those canals it is manifestly impossible to remove any portion of that softened dentine along the walls of the canal, and the removal of that softened dentine, together with all remnants of the pulp, is necessary to the success of the operation, and I think it cannot be done better than by drills. But I cannot recommend the Morey drill as Dr. Rhein has. I have used them repeatedly, have been using them more or less from the time they were introduced, and I have come to the conclusion that they are a dangerous thing to put into a tooth. Their construction is wrong. I found that out when I was making my reamers. The fault of the Morey drill is that it has too great an angle. I experimented with my reamers until I got the proper angle. In a straight canal

you can perhaps use the Morey drill with safety. I find the Gates-Gliddon drill is a superior one.

I said last night that I had learned the most of what I know at dental meetings. While in Boston, recently, I learned a point from Dr. Bliven, of Worcester, that I want to repeat to you. His treatment of pulp canals is this: he puts on a rubber dam and then with a Gates-Gliddon drill removes the softened dentine as far as possible, making as clear an opening as he can, then heats an instrument red-hot and plunges it into the canal, repeating that several times and until the sissing sound ceases. Which is an evidence that the moisture has been gotten rid of. Then he treats it antiseptically with carbolic acid, twisting a bit of cotton around the broach and pumping in the carbolic acid. Then the hot instrument is used as before. He does not hesitate then to fill the canal solidly with oxyphosphate, a thing that I have always been afraid to do, because I have thought I have not gotten rid of the absorbed deleterious matter. If he is not satisfied that the canal is not thoroughly dried and disinfected, he dismisses the patient for a few days, and then the same treatment is repeated until he is certain the canal is thoroughly dried. He tells me that he has no failures after that treatment. I think that is a point that is well worth considering, the removal, prior to filling the canal, of the deleterious matter that has been absorbed from the canal into the tooth substance, and I think that method of treatment is to be preferred to the instantaneous method now so much advocated.

In regard to cutting away the over-hanging ledges, I think every bit of the tooth structure should be removed until you get direct entrance into the canal with your instruments without fear of breaking them. But there are teeth in which we cannot use the Gates-Gliddon drill; cases where we have a posterior cavity in second or third molars, lower or upper. We may cut away a great deal of the crown of the tooth in order to get into these canals. In lower molars a large portion must be removed, in order to get into the anterior canal; and it is just as necessary to cleanse and fill the anterior canal as the posterior one. In those operations I do not know how I could get along without the Pettie reamer, which, I have been told, is an instrument not very largely used. The Pettie reamer is one that has a spiral screw between the reamer and the shaft of the instrument, allowing it to be revolved the same as the

arm of a dental engine. I use drills and reamers in all the canals I treat, and it is a great satisfaction to know that the canal is thoroughly cleansed.

Dr. Ivory—In regard to the Morey drills, I used them quite successfully at first, but after a while the drill seemed to get twisted and fixed in the canal, and would break off, and then it was difficult to remove it. Afterwards I found that it was not necessary to ream out all these broken ends of drills; by heating the instrument red-hot and passing it up the canal, and using carbolic acid in it, the root is thoroughly disinfected. Where I cannot reach the apex of the root with the larger instruments, I use a very fine broach, heating it in the same way, and using it until the little hissing sound of moisture is no longer heard. With that practice I have been very successful, more so than I have ever been with any other treatment.

Dr. Watkins—I am glad to hear that gentlemen do occasionally use carbolic acid, or some disinfectant, in putrescent teeth.

One or two points in Dr. Ottofy's paper interest me. One was the use of two or three broaches in a tooth. I have been bothered a great deal to find the canals in superior molars. After working perhaps half an hour to find the canal, and having dried it out, I would lose it, and then have something of the same trouble to find the canal again; and sometimes you think you have found it when really you are going into the other canal. It is very difficult to tell which one you are going into when you have not a good view of the cavity. It never occurred to me to leave a broach in one canal while I looked for the other. I have learned something The other point was the idea of oiling the broaches. He strikes me favorably.

I do not agree with Dr. Ottofy in regard to not drilling the canals. I do not know what he can do or what other Chicago gentlemen can do; I simply know what I can do myself, and I know I cannot cleanse nerve canals, at least ninety per cent. of them, without drilling. And this Morey drill is the only drill that I have seen that is fit to drill out a canal with. We may in the future get something that is better, but the Morey drill seems to me to be the best thing for the purpose that we have at present, inasmuch as you can go to the end of the root with safety, without danger of going through the side of the root, unless you use a

drill that is as broad as the root of the tooth in its smallest part. The drill has been found fault with on account of its breaking. It seems to me that gentlemen do not understand Dr. Morey's idea of the use of the drill. His idea is to start with a large drill, perhaps the largest size; then change it for a smaller one, and keep changing to smaller sizes as the root decreases in size towards its apex. If you begin the operation with a drill that is small enough to reach the apex of the root it will clog, and may break off; but if you begin with a large size you will not have that trouble. Another point is to keep the drill sharp. You can sharpen the Morey drill in a moment with a three-cornered Arkansas stone. You must keep the drill in motion and work fast to avoid clogging. It is a long time since I have broken a Morey drill.

Dr. Wheeler (of Albany)—I would like to add my testimony in favor of thoroughly cleansing all root canals before filling. I think that is a very essential thing in our practice that is often neglected, and the result is trouble. If the canal contains a dead or putrescent pulp, it must be disposed of in the most thorough and perfect manner, or we cannot expect good results from our work. I think 90 or 95 per cent. of all the roots we have to fill can be thoroughly cleansed by the aid of the Morey drill. I know of no better drill. I am sorry they are not better than they are, because we break them occasionally. I have spent hours in trying to remove broken drill ends. If I cannot remove them I drive them in with the mallet as much further as I can without splitting the root. I take a piece of piano wire, and with that get as near as possible to the opening, say one-sixteenth or one-eighth of an inch beyond the power of the drill to reach, and in that way I can disinfect the end of the root, at least to a very large degree. I very rarely use carbolic acid in tooth roots. I am not a lover of that drug; but I think we can use some other, such as peroxide of hydrogen or chloride of mercury, with good effect.

Dr. Stockton—Some gentlemen have spoken of breaking broaches. If you have been so unfortunate as to meet with that accident, seal the cavity up with a little common salt in it, and let it remain two or three days, and you will have no difficulty in removing the drill or broach.

Dr. Curtis—I live in the city of salt, Syracuse. I have used

iodine and all those things, and they sometimes do the work; but not in all cases. In time they will waste away.

Dr. Watkins.—Dr. Ottolengui described Dr. Bliven's method of heating an instrument and passing it into the canal. It seems to me that Dr. Bliven goes to a great deal of trouble to arrive at the same result which is accomplished by Dr. Evans' method of having a silver probe with a bulb, which is heated and the probe carried into the canal, the bulb retaining sufficient heat to accomplish the object without removing the instrument for re-heating.

Dr. Hodson—It occurs to me to say something in connection with the employment of carbolic acid as spoken of by Dr. Bliven. I think the gentlemen forget that when they employ carbolic acid to cure a disease they are producing another condition which is at least offensive, in that they are making a permanent discoloration of the crown part of the tooth by coagulating the contents of the dentinal tubuli, so that no after endeavor will enable them to bleach that tooth by any means whatever. Therefore I never use carbolic acid; have not used it for some years in root canals. I use some other disinfectant instead. I like carbolic acid well enough were it not for its discoloration of the tooth.

Dr. ——— —How does the Doctor bleach his teeth?

Dr. Hodson—You can bleach them before the contents of the tubuli have been coagulated and the teeth blackened. If those contents of the tubuli are in a fluid or dissolvable condition, the teeth can be bleached very much better than after their coagulation. I should not use any other method, perhaps, than continual washing and soaking to get out that which reaches the surface; and it will continually come to the surface by absorption. I have made great changes in the color of teeth in that way. I should not go through with much chemical bleaching.

Dr. Ivory—I may say that in all cases where the pulp was not largely putrescent, instead of using carbolic acid I use oil of cloves, thereby getting the benefit of the antiseptic property of the drug. I maintain that the red-hot broach seals up the little openings of the dental tubuli, so that you have no trouble afterwards from any fluids remaining in the pulp chamber, and which might afterwards become putrescent.

Dr. Luckey—Does it seal them?

The paper was here passed.

Dr. Curtis read a paper on implantation.

THE IMPLANTATION OF TEETH.

As the scientific aspect of this subject has so recently been considered, your attention to-day will be directed to the practical side of this comparatively new field in dental surgery. Few subjects in our profession have been more generally and more thoroughly deliberated over than this. While at present many are not sanguine that this method of restoring the lost organ will be ultimately successful, it must be remembered that our work is largely experimental. We are meeting the failures as they appear, and endeavoring to overcome them. Farther than this, we are devising new ways whereby natural teeth can be permanently fixed in the jaw. If perfection has not already been attained, it will, we are confident, be reached in due season. Where there is a demand, the way to supply it generally exists. If the world-renowned American dentist, with his intelligence, energy and ambition cannot accomplish the task before him, then he must "call upon the angels for inspiration."

For three years implantation, which already may be pronounced a justifiable and proper practice, has been prosecuted with the most gratifying results. I take pleasure in reporting to you that teeth thus embedded in the jaw two years ago remain intact, and are as useful, and to all appearances as healthy, as any others in the arch.

We are experimenting in this work entirely from a scientific point of view, and under the most favorable conditions. Hence our failures, when they do occur, enable us to consider the causes, and lead us to the discovery of better modes of operating. Is it strange that failures have to be recorded? Hundreds of teeth have been implanted; many of them under circumstances most unpromising, and by operators who for the first time performed a surgical operation greater than the extraction of a molar, and whose knowledge of surgery and pathology never extended beyond the carious tooth. Name the surgeon who, after years of experience, is prepared to affirm that he knows that his operations will be successes, and you have pronounced the name of a knave.

I have little sympathy with those who condemn every venture in scientific work, and who are ready to ridicule and censure all whose methods differ from their own. By our failures we learn to

overcome the obstacles in the path to success. Were we afraid to explore the unknown, or were we restrained by rigid dogmas, advancement would be impossible.

In performing implantation, the fully developed and healthy tooth is best adapted for the work. The objection to teeth of the youth, such as are removed in correcting irregularities, is that the root is undeveloped, while those from the patient of advanced years are prone to disease or are already affected. When teeth intended for implantation have become dry, they should be allowed to remain for a few days in a weak solution of bichloride of mercury—about one to five thousand. By this means the original color will be restored, and the chances of fracturing them while cleansing the canal are lessened. When the alveolar wall is almost or quite absorbed, only the longest teeth can be used, and the articulation maintained. In the last named case, roots with artificial crowns attached will supply the demand. These can also be employed when the palatal root of a molar is used to supply the loss of a lateral incisor.

Too much stress cannot be laid on the importance of selecting suitable teeth and of choosing the mode of operation demanded by the case under treatment. When the alveolar ridge is full and well developed, the condition is the most favorable. When it is atrophied, short teeth, or those with long crowns should be selected. This permits a complete embedding of the cementum, and thus the chances from exposure to septic influences are reduced. As living substances readily unite, we argue that freshly extracted teeth can best be employed. Their dentinal fibres and cementum are prepared to continue life, while experiments show that dried and shriveled teeth have lost the capacity of taking on life again. In the dry tooth checking has perhaps resulted, thus diminishing the chances of durability.

In preparing the tooth, all foreign and unhealthy substances should be removed from it. I have seen teeth implanted with fragments of dead pericemental membrane, salivary calculus and even parts of abscess sacks clinging to the cementum. It is hardly necessary to add that in such cases the results will likely be disastrous. The removal of the pulp and the filling of the canal can best be accomplished through an opening made in the palatal or masticating surface. Gutta-percha is probably the best filling

substance. Opening through the root wounds the cementum, and increases the chances of absorption. Indeed, the wound caused by the use of the forceps during the process of extraction may be the beginning of the breaking down of the cementum, as has been shown in the brief history of implantation.

In selecting patients for this operation, the scrofulous, those in the primary or secondary stage of syphilis, those affected by any wasting disease, and those whose system is overtaxed, or who are in the period of gestation, should be declined. It is clear that such persons are not in a condition of body which will result in quick or satisfactory healing.

In forming the socket, great care should be observed to obtain an accurate adjustment of the root. If this is done, nature in her work of reproducing the bone tissue is less taxed, while the likelihood of absorption is lessened. When the alveolar ridge is entirely wanting, and the other conditions are favorable, cut through into the substance of the bone and insert the tooth. This can be done with the same assurances of firm attachment as in the other operations. The danger of penetrating the antrum should not be overlooked; yet in cases where this has occurred no ill results have been reported.

When all is ready for the insertion of the tooth, place it for a few minutes in the sterilizing solution, the temperature being slightly above that of the body. This prevents the coagulation of the blood from the wounded bone. At the same time syringe the socket with a similar solution, and remove all clotted blood and fragments of bone. This done, press the tooth firmly in place, and anchor it to an adjoining tooth. The firm retention of the implanted organ in its new position until the process of healing is complete, by means of a staple or clasp, is essential. This fact was thoroughly demonstrated in the papers read at the last annual meeting of the First District Dental Society of New York.

If undue inflammation occurs, meet it as in the case of an acute abscess, the cold compress being one of the most effective agents.

In the cases of failures reported, there appeared to be two methods of the absorption of the root. In the first, bacteria play an important part; and, in the second, the bone cells, in penetrating the cementum and dentine, apparently know no limit, and the

root is disposed of as in sponge grafting. Finally the crown, receiving support only by its attachment to the periosteum, requires but a slight pressure to be displaced.

Cannot the success of implantation in a measure at least be attributed to natural organization or condition, that is, to the temperament? In view of the remarkable differences that exist among individuals, in consequence of the variety of the relations and proportions of the constituent parts of the body, does it not seem reasonable that teeth implanted with due regard to these conditions will be more likely to be permanently retained? May not this also account for the promptness of the healing process, and the readiness with which some teeth assume the color of their neighbors? Thus, teeth belonging to the bilious temperament, when placed under like influences, assume a normal condition and remain in it more readily than when these relations are antagonistic. The color, however, might be accounted for by the pigment peculiar to the possession of the tooth, as in all cases we do not find a perfect blending of shades. Again, this may be attributed to the septic influence of the devitalized dentinal fibres remaining in the tooth. This point is open for your consideration.

The introduction of implantation has already proved a great benefit to our profession, and its beneficent work is but begun. The investigators who have taken up this work deserve commendation; but special praise is due to him who first conceived the idea, and first put it in execution. The work already done, even if it shall prove to have been largely misdirected, will surely lead to a method whereby teeth can be permanently attached in the edentulous jaw. Thus, if bone cells have to do with the destruction of the roots as in sponge grafting, cannot the root be partly surrounded with an impervious substance which will be retained in the jaw, and which will hold the crown when the root is thrown off?

But the success which has already been reached under the present methods commends implantation to the scientific dentist, as well as to the crippled patient; for who is more maimed than he who has been the prey of the hungry knight of the forceps? For years the need of better substitutes than artificial dentures has been keenly felt, and have we not strong ground to hope that this need was answered when Dr. Younger introduced to the world this astonishing innovation in dental science?

Dr. E. C. Kirk, Phila.—Mr. President, unfortunately I was not present when the first part of Dr. Curtis' paper was read. The subject of implantation is one that interests me a great deal. The first case that I had an opportunity to operate upon was in November, 1886. That case, together with thirty-eight others up to today, have been entirely satisfactory, both to myself and to the patients for whom I have operated. There have been two instances in which I have lost implanted teeth. One was reported in the *Dental Cosmos* some time ago, and was where I implanted two teeth for a patient who had been suffering from secondary syphilis, which I was not aware of at the time. A more recent one in the mouth of a gentleman whom I took to be a typically favorable case for the operation; he was free from all constitutional vice whatsoever, and was a man of fine physique and apparently in excellent health. The tooth was selected with the same care as the other, and I am entirely at a loss to account for the failure of the operation, which occurred five or six months afterwards by absorption of the root.

We are all sufficiently familiar with the fact that teeth can become united with the alveolar process in this method of implantation introduced by Dr. Younger. The point of special interest is, how long will they last, and what are the conditions necessary to the permanency of the operation. The investigations made by our histologists, Drs. Miller, Heitzmann, Sudduth and others in this direction, seem to show that these implanted teeth are held in place or attached simply by the process of encapsulation, and I think it is unfortunate that Dr. Younger propounded the theory that the peridental membrane would become revitalized after having been separated from its normal surroundings for a considerable length of time, for that theory seems to have been disproven.

The question of the length of time an extracted tooth can remain out of the mouth and be successfully implanted is an interesting one. I have implanted teeth that had been out of the mouth from a year to eighteen months. Within the past six months I have had a letter from my friend D. H. C. Herring of Concord, North Carolina, for whom I performed this operation, stating that he has since then, in his own practice, implanted a number of teeth, among them an incisor tooth which had been extracted seventeen years previously, union taking place without difficulty. The question of the revitalization of the peridental membrane in that case would

seem to be entirely eliminated. It seems unreasonable to suppose that the membrane can retain its vitality for any great length of time. I believe that a few hours settles the question of its vitality. Theoretically it seems possible that a tooth devoid of peridental membrane may become attached after implantation. I do not mean to say it will be attached as readily, or that the conditions are just as favorable; but I see no reason why a tooth denuded of its pericentum should not become attached if the process of attachment is one of encapsulation of the root. My belief is that the old dry membrane presents a condition that is more acceptable to the tissues around an implanted tooth, which are more or less irritated by the presence of that foreign body. I think the whole secret of the successful results depends upon controlling the inflammatory process following the operation, so that it shall not at any time exceed the amount necessary to produce repair of the tissue. If the inflammation becomes excessive, nature makes an effort to get rid of the cause, and pus is formed. To avoid this result it is necessary to use, as Dr. Young did, thorough antiseptic precaution to keep the inflammatory process within the limits necessary to bring about encapsulation.

With regard to the ultimate success of the operation, the two cases I have mentioned have, I think, considerable bearing. It has been generally believed that we should not attempt an operation in cases of scrofulous diathesis, or where there is any systemic vice, such as syphilis, a strumous condition, tuberculosis, or during the period of gestation; yet I have had to report a case of failure in the mouth of a patient whom I believed to be in typically good health, the implanted tooth being lost by absorption of the root. I found that the root was almost completely absorbed. It is important to know why, in such a healthy and favorable looking case, absorption of the root should occur. I think that under-lying it all is the question of the status of the patient's nutrition, whether it is in a condition of equilibrium, whither the balance is upon the side of repair or that of atrophy. I think the nutritive conditions are variable in the individual from time to time, and that may account for the favorable or unfavorable results obtained in the operation. It is exceedingly difficult to determine what the condition of these nutritive processes is at any given time. We have a familiar example in cases of pyorrhœa alveolaris, where the patients are other-

wise in a normal condition, and yet there is this local expression of what I regard as a systemic vice, which seems to depend upon some nervous nutritive control of the mucous membrane and ligamentous tissues of the mouth that has its expression only there. We find an atrophic variety of nasal catarrh, that being only a local expression of some error in the system, and which seems to be of nervous origin. The trophic centres presiding over those tissues seem to be in an abnormal condition. Just why one cell builds up and another breaks down, and just what the conditions are which control the process, it is difficult, if not impossible, for us to decide in our present state of knowledge; and until we do know more about it, and can select our subjects with more care and intelligence, we will have these cases of absorption of the root, no matter how careful we may be in the operation.

In general, it seems to me that there is a future for this operation that is full of promise, notwithstanding the percentage of failures that have been reported.

Dr. De Lange—I had the opportunity of witnessing some of Dr. Younger's operations in San Francisco, in December, 1886. With regard to the peridental membrane, Dr. Younger says he performed the operation of implantation in several cases where the tooth was denuded of its peridental membrane, and those cases were invariably failures.

Dr. Ivory—In two cases operated upon I have had success. A lady came into my office onea day hving a lower cuspid tooth on the right side with quite a large cavity in it, and she wanted it removed. She was a poor woman, and could not afford to have any filling done. I extracted the tooth and told her to wait a few minutes. I took the tooth into my laboratory and cut off the root, and drilled it out and filled it partly up with cement; then filled the root with gold to the apex, flushing it all over and around the end of the root. I filled the other part with cement. I replaced the tooth in the mouth merely as an experiment, telling her to come back in two weeks. She did so, and it seemed to be as firm as when it was put in. I cannot say how it is now, or whether there is anything more than a mechanical union.

Dr. Sudduth—I have had no practical experience myself in this operation; but I have studied somewhat the histological and pathological points that bear upon it, and I look very favorably upon

the results to be obtained. The subject of implantation is not a new one, although it has been brought recently into prominence. I think that with our present knowledge of how to control inflammatory processes, and especially septic processes, we will have much better results from the operation than could have been obtained or expected in the earlier experiments in that direction. As regards the method of attachment, there is no doubt at all but what it is at first one of encapsulation, and following that, if the inflammatory conditions are kept in abeyance, we may get a boney anchylosis. The pericemental attachment of the teeth serve as a cushion between the root of the tooth and the bone, which in masticating serves to soften the blow. In the case of an implanted tooth we have no such fibrous tissue between, and if it is a case of bony anchylosis, the bone and the tooth come directly in contact, there is a different condition from that of a natural tooth, a condition which can be detected by the sound. If you tap with an instrument an implanted tooth it gives a hard resonant sound that is not perceived when a natural tooth in its original condition is tapped in the same way. There evidently is no intervening membrane between the tooth root and the bone; and we must infer that such a tooth would be a weaker member than one which has been undisturbed. I think it is decidedly weaker as a bridge work post than a normal root would be, and great care should be taken not to place too much strain upon such teeth.

The operation is comparatively painless. If proper antiseptic precautions are taken there is very little or no danger of impregnating the surrounding tissue with disease.

The statement is made that a tooth had been implanted with success which had upon the end of its root calcific deposits. Implanting a tooth in that condition would, it seems to me, be almost criminal. I think that all antiseptic precautions should be taken before this operation is performed.

Another question in this connection that has been talked of between Dr. Kirk and myself is how far is a dentist justifiable in proceeding in surgical operations of this kind, in which disease may possibly follow, and how far is he protected by law in these operations. It would surely place a dentist in a bad light if he were to be called before a grand jury to give expert testimony in regard to this matter, and he should be found to know nothing about anti-

septic conditions and the means of preventing them. If the testimony showed that the dentist had implanted a tooth that had not been thoroughly antiseptized it would place him in a very bad position indeed, although he might be perfectly competent to perform the mechanical operation. But are we competent to take charge of such a case from its medical aspect?

Dr. Dwinelle—I cannot speak from a very large experience on this subject; mine has been very limited; but I was intimately associated with Dr. Younger in the early part of his career here, and took great interest in his operations. I had great incredulity that such operations could be successfully performed, because it is really contrary to our prior knowledge of anatomy and physiology and the healing art; nevertheless, if a person can prove that he has jumped over the moon we are bound to believe it.

I want to sound a word of caution for the benefit of our ship of state in regard to the anæsthetic part of this subject, with particular reference to cocaine. The use of this drug up to this date is entirely experimental. We know that there are individual idioysncrasies of constitution, and that an article which one person may take with impunity would be exceedingly deleterious, if not fatal, to another. You know that some people who are in the habit of taking morphine or opium can take enough of this drug to kill half a dozen other men. These idiocyncrasies are peculiar to the individual. I have had some experience with cocaine, and even with its parent, cocoa leaves, and I take great interest in it. I have seen several instances of the administration of cocaine where there was some doubt about the recovery of the patient from its effects. So I merely rise to sound a word of alarm, and to issue a caveat to our profession at large to be more cautious in the administration of this drug. I think the best possible safeguard in the use of cocaine is to fix a limit to the quantity administered, and not to exceed that limit. I was especially delighted with the operation of Dr. Kirk here, when I found that he put a limit upon the quantity of cocaine, $\frac{1}{8}$ grain, used. We should all do that, especially as we know so little about this agent. He passed the point of the hypodermic syringe up between the periosteum and the alveolar process externally, on the labial surface, about half an inch, introduced his eighth of a grain and let it remain for five minutes or a little longer before he commenced the operation, which was then comparitively

painless. I have seen dentists use cocaine *ad libitum* in operating; they were continually injecting it from the beginning to the end of the operation. It seems to me that discretion would be the better part of valor, for I have seen instances where a patient has manifested very serious and alarming symptoms.

Dr. Kirk—Mr. President, I will speak a word on the subject of cocaine. I have always pursued the plan of using a definite quantity of cocaine, because frequently we get too profound an effect from it. I have been led to the use of one-eighth grain doses as a fair average; and from my study of the subject, I think its physiological action has been pretty well settled. I think perhaps one of the best investigations that has been made upon the subject was made by Dr. Hugenschmidt, of Paris, an associate of Dr. Thomas Evans. I have had the opportunity of looking over his work. He has made a quite extended investigation of its physiological action, and has used it largely for the purpose of extracting and in the minor surgery of the mouth, and he has said distinctly that its action is that of a vaso-motor constrictor. Knowing this to be its action, the antidote that suggests itself is nitrate of amyl, which acts in an entirely opposite direction. I have had one or two instances of somewhat marked systemic disturbance from the use of cocaine, and have counteracted it by the use of nitrate of amyl. It is one of the most potent remedies against syncope or heart failure, and controls the influence of cocaine at once. The effect of the nitrate of amyl upon the heart is to stimulate its action. Hypodermic injections of ether, or the exhibition of ether by the stomach; hot brandy punches, or hypodermic injections of ammonia, or the exhibition of aromatic spirits of ammonia by the stomach, may be resorted to as means for controlling the effect of an overdose of cocaine. A heart stimulant is what is needed. While some fatal cases have been reported, it is to be noted that as much as one grain of cocaine has been given hypodermically without fatal results. We should know the limitations of a drug in order to use it intelligently.

Dr. Cornwall—With regard to what has been said about waiting five or six minutes for the cocaine to have its effect; I witnessed a clinic given by Dr. Perine, in which he commenced to operate immediately after the administration of the cocaine, he claiming that the effect was instantaneous.

Dr. Dwinelle—It is not instantaneous.

Dr. Cornwall—There has been some curiosity expressed by those who witnessed the operation in my case as to the amount of pain endured. I believe most of those who saw the operation know that there was no cocaine administered; but this morning my attention was called to an article in one of the local papers, which stated that I was enabled to bear the pain through the application of Christian Science However that may be, I am not prepared to state positively that that helped me or that it did not. I have never had any experience before this with the Mind Cure or Christian Science. But I am not prejudiced against it, and I don't know anything in relation to it to make me very highly in favor of it. In fact I do not know of any way to settle that point, as to whether it was of any benefit to me or not in the operation other than having some teeth put in without the aid of Christian Science and without cocaine. I have a space left that is not yet filled, and if Dr. Kirk thinks it justifiable I am willing to try it. I am ready to give this a fair test, and I do it quite as much for my own satisfaction as for any other purpose.

Dr. Sudduth—Is there any soreness to-day around the implanted tooth?

Dr. Cornwall—There is no soreness. It is very quiet.

Dr. Wheeler—What was the difference between this process and the cutting of sensitive dentine?

Dr. Cornwall—I think cutting the sensitive dentine is more sharply felt than cutting a socket in the bone.

Dr. Kirk—The experience of Dr. Cornwall as to the amount of pain he suffered differs not at all from that of the patients for whom I have operated without any anæsthetic. It is not a painful operation by any means. I am sorry that this question of Christian Science has been brought in, in this connection. I am pleased that Dr. Cornwall has expressed his views upon the subject and I will state for myself that there is joy amongst one dentist in this convention over one sinner that has repented.

Dr. Smith—There is one thing in which I differ from some others: that is in being careful to have the tooth fastened in thoroughly so that there is no chance of displacing it. The tooth which I first saw implanted by Dr. Younger, in Rochester, was a bicuspid, and the fellow went to a political meeting three or four

days afterwards and got it knocked out. It was tied in with a little thread. The manner in which I fasten these teeth in is this: if there is no cavity in the tooth I cut one, and also cut one in the adjoining tooth, and put in a small staple running from one to the other, cementing it in, which holds the implanted tooth securely. It is left for two or three months until the tooth becomes firm.

Dr. Curtis—I am glad to see so much interest manifested in this subject, and in its favor. I have been surprised to find almost every one condemning the operation. A few failures have been reported, and they seem to have been selected with a view of destroying the confidence of the profession in the operation by men who are positively opposed to it; for what reason I do not know. They never have performed the operation and have taken no special interest in it. I think, like Dr. Kirk, that it is unfortunate that Christian Science has been mixed up with it here, and to have it go out to the world that we tolerated and gave some sort of endorsment, to Christian Science. I believe Christian Science is an imposition, and I do not think there is a man in this room who believes that it is anything more than an old woman's whim.

I read my paper here under protest. I got it up in a few hours, doing the best I could in that time. I am glad to have seen the operations yesterday, and I hope there are many more converts to implantation. As Dr. Sudduth says, unless we study the subject, and select our cases with great care, we will have failures and may have to suffer if brought before a jury, and we are not thoroughly posted in the matter.

As to cocaine, I believe we can very readily get a toxic effect with it. I have in a number of cases seen it in my patients. One was the case of my brother, a physician, who studied the physiological action of the cocaine. In two and a half minutes he lost his suffering. It made him sick at the stomach. He said that a minute after the injection he was stimulated to the extreme, and in three or four minutes after he was relieved. I injected it directly into a bloodvessel. I have not seen any really bad effects from the use of it. I never give it except where the patient demands it. I think a person is better qualified to stand pain without the drug than with it, and in most cases I do not use it at all.

The paper was passed.

On motion of Dr. Watkins, a vote of thanks was tendered to

all the gentlemen who have read papers at the meeting or operated in the clinics.

On motion of Dr. Levy, a special vote of thanks to Dr. J. L. Smith for kindly lending his magic lantern, and giving his services in its use.

A special committee of three, consisting of Drs. Levy, Brown and Meeker were appointed to wait upon the proprietor of the West End Hotel and tender the thanks of the Association for kind attentions to the Society.

The officers elected were duly installed.

Adjourned until half-past 2 o'clock, P.M., this day.

AFTERNOON SESSION, FRIDAY, JULY 20.

Pres. Hull, in the chair.

The Clinic Committee reported that there would be no clinics this afternoon.

The Secretary announced that the following-named members had been dropped from the roll for non-payment of dues: E. H. Bunting, Sr., L. S. Marsh, R. M. Sanger, A. J. Wright.

Dr. Adams presented a report of the Clinic Committee, which was received, and is as follow:

CLINICS, N. J. SOCIETY, JULY, 1888.

Dr. E. C. Kirk, Phila., successfully implanted a superior central incisor for Dr. Cornwall, without the use of cocaine.

Dr. T. S. Waters, of Baltimore, built up with gold superior first bicuspid, the palatine and anterior approximal sides of which were destroyed by decay. The electric mallet was nsed with six dry battery cells.

Dr. Charles F. Wheeler, of Albany, N. Y., exhibited his method of using gold with platinum and iridium, building up a right lateral and facing the cutting edges with the above-mentioned metals. He alsq built up a second lower molar completely broken down to the margin of the gums, and faced the entire grinding surface with the same metal.

Dr. William B. Finney, of Baltimore, filled with gold a right superior first bicuspid, the distal surface and corom gone. The tooth was filled from the apex with the electric mallet, using a Detroit dental motor, consuming nearly three hours time and one-eighth ounce of foil.

Dr. C. A. Timme, of Hoboken, N. J., exhibited partial cases of pure gold deposited on the cast by electricity the thickness of twenty-four gauge plate. The plates are quite stiff, and can be soldered if necessary. The lower plates are stiffened by a gold wire soldered on the lingual surface. They are made for the profession by Durand & Co., of Newark, N. J.

S. C. G.. Watkins, of Montclair, exhibited new shapes of amalgam instruments.

Dr. G. L. Curtis, of Syracuse, implanted a second inferior molar for Dr. L. N. Seymour of Asbury Park. While the operation was necessarily difficult, owing to the location and the rescission of the aveolar walls, it was eminently successful. The patient being extremely sensitive, a twenty-five per cent. solution of cocaine was employed locally with good results. The operation occupied about thirty minutes. The tooth was secured to the third molar by means of a palatinum wire staple to prevent movement of the ingrafted organ until union was complete. The tooth was examined two days later and was doing well, the patient having suffered no special inconvenience.

The Committee appointed on the President's Address would most respectfully recommend the adoption of the following Preamble and Resolutions:

Whereas, It has pleased the All-wise Ruler of the Universe, in His inscrutable wisdom, to remove from our midst our late member and companion, John W. Scarborough, while in the very vigor of his manhood and zenith of his usefulness—a man of honesty, integrity, and conscientiousness in the performance of his duty as a professional man, and citizen, and true to all the obligations of life, both morally and socially—

Resolved, That while we bow to the decree of the Most High, we will place on record our appreciation of his services as a member of our Society, and acknowledge his faithfulness in his attendance on its many meetings, and his promptness in fulfilling the duties imposed upon him.

Resolved, That a copy of this Preamble and Resolutions be recorded in the minutes of our Society.

They would also recommend, that in case of death occurring to any of our members, that the Chairman of the Executive Committee, on being notified of the fact, shall appoint a committee to attend

the funeral of the deceased member, and report to the next meeting of the Society.

[Signed.]

FRED A. LEVY,
J. HAYHURST,
S. C. G. WATKINS, } *Committee.*

Dr. Richards, of the Exhibit Committee, reported that there had been eight exhibitors of goods at the meetings, who had paid to the society $45.00. The report of the Exhibit Committee was received with thanks for their official work.

EXHIBITS.

The S. S. White Dental Manufacturing Company had on exhibition dental chairs, electric motor, dental engine, revolving fans, oxygen inhaler, new implantation instruments, crown instruments, matrices, and a full line of dental instruments generally.

Gideon Sibley, of Philadelphia, porcelain teeth, dentifrices, Sibley's gold foil, dental instruments, etc.

Seabury & Johnson, of New York, septic cotton, hydronapthol, lints, and disinfectants.

S. W. See & Co., of New York, gold foils, amalgams, dental engines, operating chair, etc.

Dr. Ivory, of Philadelphia, rubber damp clamp.

Mr. Green, of Camden, instruments and dental engine clamps.

The Florence Manufacturing Company, of New York, tooth brushes.

Welch & Co., of Philadelphia, porcelain teeth, dental equipments, etc.

Ward's Electro Metallic Dental Plate was exhibited by the inventor and Dr. E. E. Clarke, of Newark. Gold is deposited on a silver plate for use in artificial dentures.

Adjourned, *sine die.*

HOLZER